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ABSTRACT

The objectives of the study were: (1) to determine the number of training task repetitions required for an Undergraduate Pilot Training (UPT) student to become proficient, and (2) to determine the total number of task repetitions that UPT students receive for each maneuver in T-37 and T-38 training. The project was conducted in two parts. Study 1 involved the development of data collection procedures which could be used in an operational UPT program and the initial application of these procedures. Problem areas identified in this effort resulted in procedural revisions which were implemented in study 2. The data collected on recording cards from UPT students (46 in study 1 and 75 in study 2) were analyzed to provide the following descriptive statistics for each task in a specified training phase: mean, standard deviations, medians, modes, and ranges. The results for both studies are presented in summary tables in Appendix A and Appendix C (marginally reproducible in microfiche). Conclusions and recommendations relate to the usefulness of the data to the Air Training Command for UPT syllabus development. Other appended material includes a list of T-37 and T-38 maneuvers and sample data collection cards. (Author/MS)

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AIR FORCE HUMAN RESOURCES LABORATORY

UNDERGRADUATE PILOT TRAINING TASK FREQUENCY STUDY

By

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Williams Air Force Base, Arizona 85224

August 1975
Final Report for Period October 1972 – October 1974

Approved for public release; distribution unlimited.

AIR FORCE SYSTEMS COMMAND
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This final report was submitted by Flying Training Division, Air Force Human Resources Laboratory, Williams Air Force Base, Arizona 85224, under project 1123, with Hq Air Force Human Resources Laboratory (AFSC), Brooks Air Force Base, Texas 78235.

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This technical report has been reviewed and is approved.

WILLIAM V. HAGIN, Technical Director
Flying Training Division

Approved for publication.

HAROLD E. FISCHER, Colonel, USAF
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The objectives of this project were to determine the number of training task repetitions required for a UPT student to become proficient in each UPT task, and to determine the total number of task repetitions that UPT students receive for each maneuver in T-37 and T-38 training. This report describes the results of two studies. Study I shows the development of data collection procedures which could be used in an operational UPT program and the initial application of these procedures at Williams AFB, Arizona. Study II describes the operational implementation of improved data collection procedures at Craig AFB, Alabama. Computer programs were used to analyze the data to provide the following descriptive statistics for each task in a specified training phase: mean, standard deviations, medians, modes, and ranges (maximum and minimum values). The results should be useful to the Air Training Command for UPT syllabus development.

SUMMARY

Objective

The objectives of this study were: (1) to determine the number of training task repetitions required for a UPT student to become proficient, and (2) to determine the total number of task repetitions that UPT students receive for each maneuver in T-37 and T-38 training.

Approach

This project was conducted in two parts. Study I involved the development of data collection procedures which could be used in an operational UPT program and the initial application of these procedures. Problem areas identified in this effort resulted in procedural revisions which were implemented in Study II. These changes included increased management support, improved data collection procedures, and more timely data tabulation.

Results

Computer programs were used to analyze the data to provide the following descriptive statistic for each task in a specified training phase: mean, standard deviations, medians, modes, and ranges (maximum and minimum values). The results for both studies are presented in summary tables in Appendix A and Appendix C.

Implications

These data should be useful to the Air Training Command for UPT syllabus development. However, potential users are cautioned that the results reflect the syllabus in being at the time of the study and that a different syllabus might produce different results. Similarly, weather, airspace, and other operational considerations may have significant impact upon data collected at other training bases. The method used to collect the data was effective for Study II and very few procedural changes would be required for future studies of this type.

PREFACE

This effort was conducted by the Flying Training Division of the Air Force Human Resources Laboratory supported by the 82d Flying Training Wing (Williams AFB, Arizona) in coordination with Headquarters, Air Training Command. The report represents a portion of the research program of Project 1123, USAF Flying Training Development, Dr. William V. Hagin, Project Scientist; Task 112303, Exploitation of Flight Simulation in Undergraduate Pilot Training (UPT), Mr. James F. Smith, Task Scientist.

Several individuals and organizations contributed to the accomplishment of this project and deserve special mention. Capt Jack Williams deserves special mention for his effort on the Williams AFB study. Capt James Beggerly, ATC/DOY, provided Air Training Command Headquarters assistance during the Craig AFB study. Lt Paul Whitmore and Lt Ray Beverly supervised data collection by the 29th Flying Training Wing at Craig AFB, Alabama, and made numerous suggestions for procedure improvements. Mr. Richard Greatorex and Lt Michael L. Cyrus provided the necessary computer programming assistance to reduce the large quantities of data generated during the project.

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UNDERGRADUATE PILOT TRAINING TASK FREQUENCY STUDY

I. INTRODUCTION

The technique of measuring learning by counting the number of trials to reach a given criterion level is well known in training. This requirement was indicated by both of the Undergraduate Pilot Training (UPT) 1975–1990 contracted studies (Northrop Corporation, 1971; Lockheed-California Company, 1971). During these studies, both contractors requested task frequency data from Air Training Command in order to construct their recommended training programs. Since data were not available at that time, both contractors had to return to the usual method of recommending flying training programs based upon flying hours instead of the number of practice repetitions.

Similarly, the USAF Future Undergraduate Pilot Training Mission Analysis Study Group also had need to know the number of repetitions that students receive on maneuvers in order to develop the Future UPT training programs. The Flight Simulation Appendix of the Final Report of the Mission Analysis Study for Future UPT (Mission Analysis Study Group, 1972) cites a need to collect data of this type. This report states, "The syllabus for the future UPT was constructed using estimated data about the number of repetitions that a student requires in training on a given maneuver or task. Actual training data will be needed in order to validate and to make adjustments in these estimates."

In response to an Air Training Command (ATC) Request for Personnel Research (RPR 73-37, 11 Jan 75), Flying Training Division, Air Force Human Resources Laboratory, initiated a study in 1972 to collect task repetition data at Williams AFB, Arizona. This study was an effort to gather task repetition data in an operational environment. As such, the Williams AFB study served to develop and test the technique for collecting these data. However, operational and procedural problems resulted in excessive amounts of missing data for selected training phases. As a result of experience gained in the Williams AFB study and the need for additional task repetition information, the Air Training Command requested that task repetition data be collected at Craig AFB, Alabama. The Craig AFB study was initiated in October 1973 and completed in May 1974.

This report presents the results of the Williams AFB study and the Craig AFB study. The objectives of both studies were: (1) to determine the number of training task repetitions required for a UPT student to become proficient in each UPT task, and (2) to determine the total number of event repetitions that a UPT student receives in each maneuver in T-37 and T-38 training.

II. METHOD FOR STUDY I (WILLIAMS AFB)

Subjects

T-37 Phase. Twenty UPT students were selected from class 73-03 for the T-37 phase of the study. All subjects had successfully completed T-41 screening training. Previous flying experience ranged from 16 hours of T-41 training to 3,000 hours; 80% of the students had less than 40 hours. These figures are generally consistent with the composition of an average UPT class.

T-38 Phase. Twenty-six UPT students were selected from class 73-03 for the T-38 phase of the study; 13 of these subjects had participated in the T-37 phase of this effort. Previous flying experience for this group of subjects was the same as the T-37 student sample except that all subjects had received an additional 82.5 hours in the T-37 aircraft.

Procedures

Conduct of this study required development of special purpose data recording cards which were not available in UPT. Five-by-eight inch cards were used since this card size fit the clipboard used by instructor pilot (IP). Sample data cards are shown in Appendix D. For easy identification, different colored cards were used for each phase of training. Both proficiency and task repetition data were collected on the same card.

The data recording procedure can best be described by means of an example. Figure 1 shows a section of a Contact phase data collection form.

CONTACT

1 DATE	2 MISSION					3 IP		4 STUD		
TASK	U	F	G	E		TASK	U	F	G	E
GRD OPS						VERT RECV				
TAKEOFF						30 TURN				
T.O. CLIMB						45 TURN				
LEVEL OFF						60 TURN				
TIME ARRIVE AREA						TIME ST&L				
ST PRW ST	1	25 [6]	4	(3)		MAX C TURN				

Figure 1. **Sample of contact phase data collection card.**

Date and mission entries required on Figure 1 are self-explanatory. IP and subject (STUD) numerical codes were entered in the appropriate blanks. In the data entry to be explained (enclosed by heavy outline), the student performed six trials on the straight ahead power-on stall task. Each trial was graded using the Air Training Command absolute scale of *unable to perform (U), fair (F), good (G), or excellent (E)* in the order the student performed them. The first repetition was performed poorly and was recorded by placing a number 1 in the "U" column. The second repetition was slightly better and was recorded by placing a 2 in the "F" column. The IP then demonstrated a stall and recorded this by circling the number 3 in any column. On repetition 4, the student performed a stall which was graded "G." Repetition 5 was judged "F." The square drawn around repetition 6 indicates that in the opinion of the IP, the student demonstrated minimum proficiency on the trial and at this time his performance was consistent enough to safely practice this maneuver solo if solo stalls were permitted.

Data for this study were collected over a 48-week period using subjects from class 73-03 at Williams AFB, Arizona; data were collected throughout T-37 and subsequent T-38 training.

At the beginning of the project, a thorough briefing was given to all students, instructors and supervisory personnel which covered the objective, procedures to be followed and performance expected. Since instructors frequently rotated in and out of the training squadron involved, this briefing was repeated as necessary.

Prior to each flight, the student obtained a data card from a supply located in the briefing room; new cards were used for each sortie. It was the responsibility of the student to insure that the card was given to the instructor on dual flights. Data collection procedures as described earlier were followed and maneuvers were recorded as they were performed. At the end of each flight, completed cards were deposited in a special locked box located in the briefing room. Data cards were collected and tabulated as frequently as manpower permitted; in most instances, data were tabulated the following day although in some instances data collection and tabulation did not occur until one week later.

On student solo flights and formation flights, the data collection procedures were altered slightly for flight safety purposes and the student or instructor completed the data collection form after the flight.

Every effort was made to get the instructors to record honest appraisals of student progress. During all briefings to students and/or instructors, it was emphasized that these data would be used only for research purposes.

In an attempt to improve the validity of the data, students and instructors were assigned numbers to use instead of names. The intent of this action was to convince the subjects that their data would not be used for personal identification and that the information provided did not have to reflect administrative adherence to syllabus requirements.

Results

Task repetition data were compiled on computer cards for each subject and task. Computer programs were used to analyze the data to provide the following descriptive statistics for each task in a specified training phase: means, standard deviations, medians, modes, and ranges (maximum and minimum values).[1]

The Air Training Command plans to develop a new program for the middle 68% of the trainee distribution and to individually manage the 16% low-ability and the 16% high-ability students (U.S. Air Force Mission Analysis Study Group, 1972). Therefore, means and standard deviations were calculated for each event since the middle 68% of a normal distribution is defined by the mean plus or minus one standard deviation. Further, to provide identification of data distributions where the assumption of normality might be suspect, additional measures of central tendency (e.g., median and mode) were computed.

During the initial tabulation and preparation of the data for computer analysis, it became apparent that mission data from several sorties had gone unrecorded. When omissions were noted on a timely basis, an effort was made to contact the instructor or student and obtain an estimate of the missing data. If this attempt failed, there was no other way to obtain the data and the subject was eliminated from the sample for that respective phase of training. (In most instances, omissions of this type occurred in close proximity to the completion of T-37 and T-38 training.)

In addition to omissions noted above, task frequency data for other phases of this first methodology development study were not collected. These were T-37 formation training, navigation, and ground device instrument training. T-37 formation training data were not collected because the ATC syllabus in use at the time did not require students to become proficient on the tasks involved. Data on navigation training tasks were collected but preliminary examination of the data indicated that a systematic analysis would not be useful since only five missions were flown. Thus, there were not enough trials on specific training tasks to reveal a consistent pattern. Data were not collected for the ground instrument trainer phase, since the experimenters were unable to brief the instrument ground trainer instructors in sufficient time to begin data collection.

T-37 Phase Data. Task repetition data for the T-37 contact flying were complete and summary statistics on trials to proficiency and the total number of training repetitions are presented in Appendix A.[2] For reasons stated earlier, no other T-37 data were analyzed.

T-38 Phase Data. Task repetition data collected in the T-38 phase of UPT were complete for the number of training repetitions to proficiency for contact, instruments (aircraft), and instruments (trainer). Summary tables for these data are presented in Appendix A.

III. METHOD FOR STUDY II (CRAIG AFB)

Subjects

T-37 Phase. Forty-two UPT students were selected for the T-37 phase of the study. These students were from class 75-02 at Craig AFB, Alabama. All students had successfully completed centralized T-41 screening. Previous flying experience ranged from 25 hours to 1500 hours; only four students (10%) had more than 40 hours.

[1] For a more detailed discussion of the issues of central tendency consult Minium (1970).

[2] The reader should consult Appendix B for the meanings of the abbreviations used for the maneuvers.

T-38 Phase. Thirty-three students were selected from class 75-06 at Craig AFB, Alabama, for the T-38 phase of the study. Previous flying experience for this group ranged from 100 hours (which included UPT T-41 and T-37 training) to 1050 hours.

Procedures

This study was performed using two different classes of UPT students; one class for T-37 data and one for T-38 data. Both classes initiated training on the same calendar date. However, due to the differences in length of the training phases, the T-37 students completed their program approximately six weeks earlier than the T-38 students; total length of the study was approximately 28 weeks.

The data recording procedures were essentially the same as those reported for Study I. The data cards were completed in exactly the same manner. The principle changes in procedure were suggested by events encountered in Study I. In this context, the areas of *command support, data collection controls, and data tabulation procedures* were affected.

Command Support is a necessary requ[illegible]y investigation conducted in an operational command environment. To accomplish the C[illegible] direct ATC support was requested and the study was organized as shown in Figure 2.

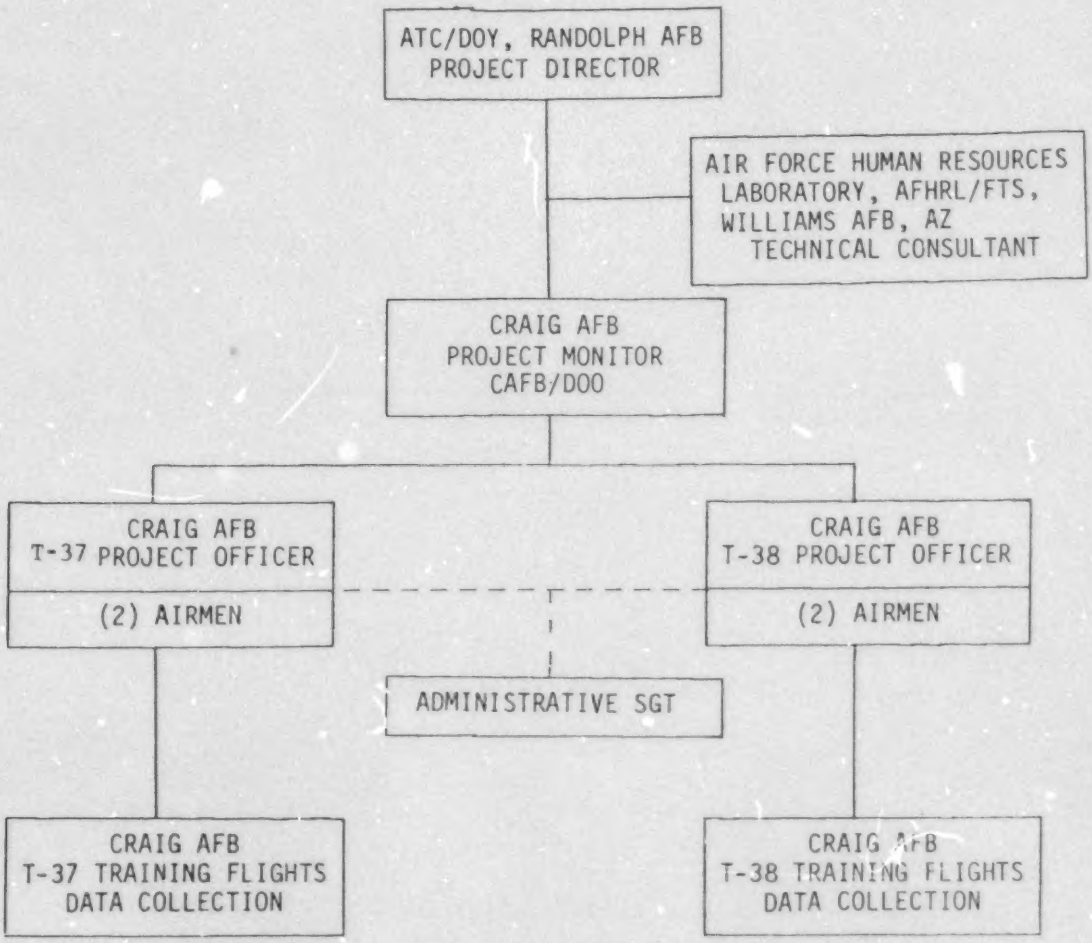

Figure 2. **Study II organization at Craig AFB.**

As shown in Figure 2, Air Training Command Headquarters (ATC/DOY) provided support through direction and monitorship. Air Force Human Resources Laboratory (Flying Training Division) personnel served as consultants and provided training and briefing to ATC personnel concerned with collection and tabulation of project data. An overall project monitor from the Director of Operations (DOO) at Craig AFB was assigned the responsibility of monitoring the program on a daily and weekly basis. Project officers were assigned at the squadron level for both the T-37 and T-38 classes; it was their duty to insure that data were collected and tabulated daily. Two airmen assisted each of these project officers and an administrative sergeant provided backup support for the airmen and administrative support.

Data collection controls for the study were developed to insure that data cards were completed and submitted by the students at the completion of each mission. The student picked up a task frequency form at the same time that he signed out to go on a training mission. These forms were completed by the instructor or student during or immediately after the mission; it was mandatory that the data collection form be completed and turned in before the student was permitted to sign in from the flight.

Data tabulation was performed on a daily basis. Completed data cards were grouped by training phase and mission number. Mission data were entered on a master sheet which enabled the project officer to quickly see which missions the student had completed. Next, data for initial proficiency for such student/task were recorded on a special ready reference sheet, thus providing a cumulative summary of training tasks on which a student had become proficient. Then the number of repetitions by the student were recorded for each phase of training; e.g., contact, instruments, and formation. Finally task cards were prepared for the student's next mission. Tasks on which the student was proficient were marked on each new card prior to issue.

Results

Data collection procedures introduced in this study resulted in more complete records than obtained in the earlier study. However, there were still students who failed to furnish completed data cards for some missions. When this occurred, data for these students were omitted for the type of training in which the omission occurred. Consequently, the number of subjects (N) differs from one table of results to another.

Concerns expressed in Study I regarding distributions of data were applicable to data collected in this study. Hence, the same descriptive statistics (i.e., mean, standard deviation, median, mode, range and histograms)[3] were computed for each maneuver for a given training phase.

T-37 Phase. Task repetition data were collected for contact, instruments (aircraft), instruments (trainer), and two-ship formation. The data for the number of repetitions to reach proficiency and the total number of repetitions during training are summarized and presented in Appendix C.[4]

T-38 Phase. Task repetition data were collected for contact, instruments (aircraft), instruments (trainer), two-ship formation and four-ship formation. Data collected for four-ship formation training were complete only for the number of repetitions to proficiency; data for the total number of repetitions were not analyzed due to missing data. Summary data tables for the number of repetitions to reach proficiency and the total number of training repetitions are presented in Appendix C.

IV. DISCUSSION

The purpose of this project was to collect task frequency data for use in UPT syllabus construction and related research. Study I served to develop a methodology. Experience gained during Study I suggested modifications necessary for successful conduct of studies of this type and Study II represented an application of the improved methodology. Results obtained from Study II were a positive indication of the value of continuous command support, daily data tabulation, and the application of more rigorous control over student and instructor data collection procedures thereby improving accuracy of the results.

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[3] Histograms for the T-37 and T-38 phase data were prepared but due to their bulk were not included in the report.

[4] The reader should consult Appendix B for the meaning of the abbreviations used in the Appendix Tables.

Potential users of data collected in Studies I and II should consider the possible impact that weather, distances to practice areas and syllabus changes have upon the total number of training task repetitions. Flight training conducted at a "bad weather" base may require students to fly more instrument maneuvers than students at a "good weather" base. Conversely, training at a "good weather" base may emphasize contact maneuver simply due to the absence of instrument flying weather. With fixed sortie lengths, distances to practice areas at each ATC base obviously influence the total number of training task repetitions possible in the time spent in the practice area (i.e., close practice areas permit more task repetitions per sortie). Syllabus changes may affect the total number of training task repetitions since the addition of new skills (or changes in sequence of those presently taught) may impact learning efficiency in subsequent training phases.

In the present investigations, it would have been desirable to compare the results of data obtained at different training bases However, it was not possible to compare statistically the results of the Williams AFB study and the Craig AFB study due to differences in data collection procedures and differences in the syllabi used in each study.

No attempt is made to specify precisely how the data from these studies should be used. The data are summarized and presented in tabular formats for easy use. The number of observations for a given training maneuver are presented in the tables to provide the user with information about the number of times that students reported performing a task. For a given task, the results are considered to be stable if the number of observations in relation to the number of students in the sample is high. Conversely, when the number of observations for a task is low in relation to the number of students in the sample, the user should exercise caution in making inferences.

In Studies I and II, data for *turns, leveloffs,* and *straight and level* represent maneuvers which are practiced on every UPT flight. Yet, the practice trials shown in the results represent the number of training repetitions that these maneuvers were practiced intentionally. Once these maneuvers were learned, students and instructors discontinued counting repetitions.

Four-ship formation data show a very low number of repetitions to proficiency. However, this fact is not surprising since four ship formation is taught to T-38 students after they have received training in two ship formation.

Upon examination of the task repetition data, it can be noted that for some tasks, the number of students on which task frequency data were collected may be considerably less than the total number of subjects in that sample. This occurred for any one or more of the following reasons:

a. The IP chose not to include training on the tasks.

b. The student knew how to do the task and, therefore did not receive further training.

c. The student may have performed the task and received training but did not achieve proficiency (at least in the opinion of his instructor).

d. For either safety or forgetting reasons, the IP failed to note the achievement of proficiency in the task.

V. CONCLUSIONS AND RECOMMENDATIONS

Data collection procedures developed for these studies may be useful for application in other operational flying training programs within the USAF. The resulting data would provide information about student learning rates useful for syllabus development or revision. If studies of this type are implemented, they require constant attention during the data collection phase and it is suggested that application of the following principles will improve the results:

a. Operational command support on a continuing basis is vital to the success of the study.

b. Emphasis should be placed upon keeping the data collection requirements simple. When airborne and the attention of the student and IP are upon the instructional process and flight safety, data collection is secondary.

c. Administrative considerations also greatly influence the success of these studies. For example, frequent briefings are required to explain data collection problems and to motivate students.

d. Daily data tabulation must be performed immediately following each sortie to insure that missing data are retrieved quickly and to reinforce the knowledge among students and instructors that their data inputs are important

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Table A1. T-37 Contact Results for Repetitions to Proficiency Data: Study I at Williams AFB (19 Students)

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
GR ND OPS	19	6.05	2.32	6.0	6.00	10.	2.
TAKEOFF	19	11.74	6.37	11.0	19.00	25.	3.
T.O. CLIMB	19	8.16	3.85	7.0	8.00	17.	2.
LEVEL OFF	19	12.05	6.30	12.0	13.00	25.	3.
ST PWR ST	19	6.68	2.65	7.0	7.00	13.	3.
T PWR ST	19	6.00	2.87	6.0	6.00	13.	2.
RD TPS	19	6.58	2.57	6.0	6.00	13.	3.
NH TPS	19	7.21	1.51	7.0	7.00	10.	4.
NL TPS	19	7.42	1.84	7.0	7.00	12.	4.
L TPS	19	6.63	1.77	7.0	7.00	10.	4.
SLOW FLT	19	5.26	1.82	5.0	4.00	10.	3.
SPIN PREV	19	4.11	1.56	4.0	3.00	8.	2.
SPIN	18	4.39	1.58	4.0	4.00	8.	1.
INV RECV	19	4.37	2.27	4.0	4.00	10.	2.
DIVE RECV	19	5.63	2.56	5.0	5.00	13.	1.
VERT RECV	18	5.61	2.45	5.0	7.00	10.	2.
30 TURN	18	5.56	3.20	5.5	6.00	13.	1.
45 TURN	18	6.33	3.09	6.0	6.00	14.	2.
60 TURN	19	8.63	5.36	6.0	6.00	20.	2.
TIME ST+L	18	5.11	3.07	4.5	5.00	13.	2.
MAX G TURN	18	2.94	2.04	2.5	3.00	8.	1.
L-8	18	3.94	2.67	3.0	2.00	9.	1.
LOOP	18	3.33	2.20	2.5	2.00	9.	1.
A.R.	18	2.83	1.82	2.0	2.00	8.	1.
H.R.	18	4.50	3.37	3.0	2.00	12.	1.
C-H	19	3.32	1.70	3.0	3.00	7.	1.
IMM	18	2.94	1.26	3.0	3.00	5.	1.
C-I	19	3.11	1.97	2.0	2.00	7.	1.
SPLITS	19	2.42	1.22	2.0	1.00	4.	1.
HP ST-IN NORM	19	3.95	1.68	4.0	2.00	7.	2.
HP ST-IN NORM LDG	19	3.79	1.87	3.0	2.00	8.	2.
HP ST-IN NO FLAP LDG	8	2.50	.93	2.5	2.00	4.	1.
HP ST-IN NO FLAP	7	2.57	1.27	3.0	4.00	4.	1.
HP OVH NORM PAT	19	11.95	6.42	11.0	17.00	28.	3.
HP OVH NORM PAT LDG	19	10.32	4.71	11.0	11.00	23.	3.
HP SS PAT	19	6.42	2.85	6.0	5.00	13.	2.
HP SS PAT LDG	19	5.26	2.23	5.0	5.00	11.	2.
HP CLOSED	19	7.16	3.35	7.0	9.00	17.	2.
HP GO-AROUND	18	5.33	3.24	5.5	6.00	13.	1.
HP ST. TURN	19	6.11	3.81	5.0	5.00	15.	1.
WMS NORM PAT	19	10.37	5.86	17.0	16.00	27.	9.
WMS NORM PAT LDG	19	13.68	6.06	13.0	19.00	25.	3.
WMS SS PAT	19	3.58	1.46	4.0	4.00	7.	1.
WMS SS PAT LDG	19	3.37	1.38	3.0	5.00	5.	1.
WMS CLOSED	18	4.22	1.90	4.0	3.00	10.	2.
WMS GO AROUND	18	7.50	4.16	7.0	6.00	20.	3.
WMS ST TURNS	19	6.58	2.97	7.0	9.00	11.	1.

Table A2. T-37 Contact Results for Total Number of Repetition Data: Study I at Williams AFB (19 Students)

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
GRND OPS	19	27.32	6.22	28.0	32.00	37.	13.
TAKEOFF	19	35.68	11.85	35.0	37.00	69.	20.
T.O. CLIMB	19	29.05	7.55	28.0	26.00	47.	20.
LEVEL OFF	19	40.95	17.84	40.0	43.00	104.	22.
ST PWR ST	19	14.95	3.49	15.0	20.00	21.	10.
T PWR ST	19	12.37	5.06	11.0	8.00	25.	6.
PO TPS	19	14.58	3.08	15.0	15.00	21.	9.
NH TPS	19	15.05	2.15	15.0	16.00	19.	11.
NL TPS	19	15.00	2.98	15.0	13.00	22.	11.
L TPS	19	14.16	2.95	14.0	15.00	20.	10.
SLOW FLT	19	15.84	4.80	16.0	14.00	26.	6.
SPIN PREV	19	10.42	3.08	10.0	10.00	18.	6.
SPIN	19	6.74	1.85	7.0	7.00	11.	4.
INV RECV	19	14.42	3.75	14.0	15.00	24.	9.
DIVE RECV	19	15.47	3.55	16.0	18.00	22.	8.
VERT RECV	19	14.05	5.01	14.0	11.00	27.	5.
30 TURN	18	10.22	4.94	11.0	13.00	19.	1.
45 TURN	18	11.11	4.35	12.0	12.00	19.	4.
60 TURN	19	14.47	6.87	17.0	19.00	26.	2.
TIME ST+L	19	9.58	5.01	8.0	7.00	20.	3.
MAX G TURN	19	5.89	4.36	4.0	4.00	20.	1.
L-8	19	12.89	7.62	12.0	14.00	28.	2.
LOOP	19	9.26	4.03	9.0	11.00	16.	3.
A.R.	19	11.21	5.73	11.0	13.00	24.	1.
H.H.	18	12.78	5.48	12.0	13.00	25.	4.
C-C	19	8.68	4.57	8.0	8.00	20.	3.
IMA	18	9.61	4.97	7.5	7.00	20.	4.
C-L	19	8.63	4.91	8.0	7.00	22.	1.
SPLITS	19	7.16	3.24	7.0	7.00	14.	1.
HP ST-IN NORM	19	12.00	2.29	12.0	13.00	16.	8.
HP ST-IN NORM LDG	19	11.89	2.23	12.0	12.00	16.	8.
HP ST-IN NO FLAP LDG	17	2.18	1.07	2.0	1.00	4.	1.
HP ST-IN NO FLAP	16	2.06	1.00	2.0	1.00	4.	1.
HP OVH NORM PAT	19	18.47	7.35	20.0	20.00	32.	4.
HP OVH NORM PAT LDG	19	16.84	6.16	18.0	20.00	26.	4.
HP SS PAT	19	14.79	4.08	15.0	15.00	21.	9.
HP SS PAT LDG	19	13.00	4.00	13.0	10.00	20.	7.
HP CLOSED	19	18.05	6.37	17.0	15.00	29.	8.
HP GO-AROUND	19	9.95	4.21	9.0	11.00	20.	3.
HP ST. TURN	19	13.95	4.45	14.0	15.00	23.	5.
WMS NORM PAT	19	48.05	16.20	46.0	53.00	78.	15.
WMS NORM PAT LDG	19	40.74	13.81	40.0	36.00	70.	12.
WMS SS PAT	19	9.11	3.46	8.0	10.00	18.	5.
WMS SS PAT LDG	19	7.37	2.65	7.0	7.00	14.	3.
WMS CLOSED	19	5.11	2.64	5.0	4.00	11.	1.
WMS GO AROUND	19	15.95	7.09	15.0	13.00	33.	4.
WMS ST TURNS	19	21.21	4.16	22.0	23.00	29.	11.

Table A3. T-38 Contact Results for Repetitions to Proficiency Data: Study I at Willi[illegible] Arm (13 Students)

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
GRD UPS	13	1.69	.75	2.0	1.00	3.	1.
TIU	13	2.62	1.98	2.0	1.00	8.	1.
CLIMB	13	3.46	1.81	3.0	2.00	8.	2.
L U	13	4.46	3.38	4.0	2.00	13.	1.
TURNS	13	3.08	2.90	3.0	8.00	10.	1.
F T FF S	12	4.83	1.70	5.0	5.00	7.	1.
SA FF S	13	4.15	1.77	4.0	5.00	7.	1.
F T S NF	12	3.17	2.00	2.5	2.00	7.	1.
AFT SN	10	3.10	1.85	3.0	3.00	7.	1.
AFT SN BD	3	1.33	.58	1.0	1.00	2.	1.
SLO F	13	4.23	1.54	4.0	4.00	7.	1.
L-B	13	4.77	3.22	4.0	4.00	12.	2.
LOOP	13	2.38	1.20	2.0	2.00	6.	1.
A-R	13	2.62	1.50	2.0	2.00	7.	1.
B-R	13	4.46	3.02	4.0	2.00	10.	1.
C-R	13	3.46	2.18	3.0	2.00	8.	1.
IMM	13	3.77	2.80	2.0	2.00	11.	2.
S-S	13	3.31	2.02	3.0	3.00	8.	1.
CHAN	12	3.75	2.77	3.0	2.00	11.	1.
V RECV	13	3.77	2.39	3.0	3.00	8.	1.
U RECV	13	3.46	2.40	3.0	2.00	8.	1.
N P/U	12	13.92	10.44	11.5	21.00	35.	2.
FIN T	12	23.00	13.63	20.0	12.00	52.	4.
FIN	13	19.08	11.19	17.0	5.00	40.	5.
TU	13	19.23	10.90	18.0	19.00	40.	7.
GUA	13	5.15	2.94	5.0	7.00	11.	1.
CLOSED	12	8.67	4.58	9.0	9.00	18.	1.
S E PAT	13	7.08	2.50	8.0	8.00	11.	3.
S E IIN	12	5.83	2.59	6.0	9.00	9.	2.
S E TU	13	8.08	2.78	8.0	9.00	10.	2.
S E GU	11	2.64	1.12	3.0	4.00	4.	1.
N F P/U	12	5.58	2.57	5.5	9.00	9.	1.
N F FI	12	8.92	3.60	8.0	5.00	16.	2.
N F FIN	13	8.46	3.10	8.0	8.00	15.	2.
N F TU	13	8.46	3.02	5.0	5.00	13.	3.
HVY P	8	3.13	1.13	3.0	2.00	5.	2.
HVY L	6	2.83	1.17	2.5	2.00	5.	2.
HVY GU	5	2.80	1.14	3.0	3.00	4.	1.

Table A4. T-38 Instrument (Aircraft) Results for Repetition to Proficiency Data: Study I at Williams AFB (22 Students)

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
GRD OPS	22	4.36	1.05	4.0	5.00	6.	2.
ITO	22	8.18	2.36	8.0	7.00	11.	2.
CLIMB	22	5.77	2.91	7.0	10.00	12.	2.
SID	22	8.68	3.24	9.0	9.00	13.	3.
L.O.	22	7.14	4.13	8.0	4.00	18.	3.
INST HOG	22	4.59	3.83	4.5	7.00	17.	3.
ST BAR	14	4.42	1.01	4.0	8.00	7.	2.
CHG.A/S S&L.	22	7.36	4.11	7.0	13.00	17.	2.
CHG A/S TURN	22	8.00	2.74	8.0	9.00	10.	2.
CAS CLIMB	22	4.00	2.70	4.0	4.00	10.	1.
CAS DES	22	5.18	2.75	4.5	4.00	10.	1.
RATE CLIMB	22	5.32	2.15	5.5	2.00	9.	1.
RATE DES	22	5.86	2.77	2.5	2.00	12.	1.
VERT SA	22	5.32	1.65	4.0	5.00	7.	3.
VERT SB	7	1.20	0.45	1.0	1.00	2.	1.
VERT SC	4	1.00	0.00	1.0	1.00	1.	1.
VERT SD	22	5.32	1.82	4.0	4.00	8.	1.
S TURN 45 DEG	22	2.04	1.43	2.5	5.00	6.	1.
S TURN 60 DEG	22	4.86	5.00	4.0	4.00	11.	1.
S TURN TAC	16	2.87	1.59	2.0	2.00	7.	1.
SLO FLT	22	5.00	2.58	5.0	6.00	11.	1.
AIL ROLL	22	8.14	3.99	8.5	5.00	14.	1.
WINGOVER	22	8.95	3.33	8.0	9.00	13.	1.
ON ATT	22	5.59	4.07	5.5	1.00	12.	1.
FIX FIX	22	7.14	3.08	7.0	7.00	14.	2.
INT MAIN COURSE	22	5.86	3.37	5.5	8.00	13.	1.
HOMING	10	2.20	0.79	2.0	3.00	3.	1.
ARC	22	4.36	2.15	4.5	5.00	8.	1.
HOLDING	22	4.05	2.66	3.0	3.00	11.	1.
PEN	22	8.95	3.36	8.5	9.00	13.	2.
ENR DES	19	2.15	1.07	2.0	2.00	5.	1.
TAC APP	22	5.86	2.27	8.0	3.00	10.	3.
ILS	22	3.73	1.45	3.5	3.00	8.	1.
ILS MAN	18	2.78	2.05	2.0	2.00	8.	1.
ILS S.E.	15	1.27	0.70	1.0	1.00	3.	1.
GCA	21	3.38	1.91	3.0	2.00	9.	1.
GCA S.E.	14	1.79	0.80	2.0	1.00	3.	1.
GCA NO GYRO	7	1.00	0.00	1.0	1.00	1.	1.
MISSED APP	22	0.45	0.29	0.4	1.00	1.	0.
S.E. MISSED APP	18	0.18	0.08	0.2	0.00	0.	0.

Table A5. **T-38 Instrument (Trainer) Results for Repetitions to Proficiency Data: Study I at Williams AFB (22 Students)**

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
GRT UP	22	4.18	1.10	4.0	4.00	7.	2.
ITO	22	4.55	1.47	4.0	4.00	7.	2.
CLIMB	22	4.04	1.43	5.0	5.00	7.	2.
SID	22	4.50	1.79	4.0	4.00	9.	2.
L.O.	22	8.00	4.23	7.0	7.00	18.	3.
TRN MUG	22	7.36	4.06	8.5	4.00	19.	2.
ST BAR	20	3.10	2.00	2.0	2.00	9.	1.
LMG.A/S SA..	22	5.45	2.69	5.0	4.00	11.	1.
LMG A/S TU..	22	5.95	2.85	6.0	7.00	12.	1.
LAS CLIMB	22	4.91	2.35	5.0	5.00	12.	2.
LAS DES	22	5.19	2.83	5.0	5.00	14.	2.
RATE CLIMB	22	5.36	3.09	4.0	4.00	12.	1.
RATE DES	22	4.45	2.54	4.0	4.00	14.	2.
VERT SA	20	4.50	1.88	4.0	3.00	8.	1.
VERT SB	21	4.00	1.81	4.0	4.00	7.	1.
VERT SC	12	2.42	1.02	2.0	2.00	7.	1.
VERT SD	22	4.50	2.99	3.5	3.00	12.	1.
S TURN 45 DEG	22	5.32	2.44	4.5	4.00	12.	1.
S TURN 60 DEG	22	8.73	3.85	7.5	7.00	17.	4.
S TURN TAC	13	2.38	1.19	2.0	2.00	5.	1.
SLO FLT	22	4.55	1.97	4.0	4.00	9.	2.
AIL ROLL	22	3.36	1.84	3.0	3.00	7.	1.
WINGOVER	22	4.23	1.80	4.0	4.00	7.	1.
ON ATT	22	0.14	2.44	0.0	0.00	11.	2.
PIA PIA	22	0.41	2.08	0.5	0.00	11.	2.
INT MAIN COURSE	22	5.95	3.09	8.5	8.00	12.	1.
MOMING	12	2.00	0.74	2.0	2.00	3.	1.
AMC	22	4.82	2.20	5.0	6.00	9.	1.
HOLDING	22	4.05	1.53	4.0	4.00	8.	1.
PEN	22	8.23	1.95	8.5	7.00	9.	3.
ENR DES	15	2.13	0.92	2.0	2.00	4.	1.
TAC APP	22	8.41	2.40	8.0	8.00	10.	1.
ILS	21	1.38	2.30	1.0	1.00	12.	1.
ILS MAN	15	2.33	1.80	2.0	2.00	7.	1.
ILS S.E.	12	1.83	0.94	2.0	2.00	4.	1.
GCA	22	9.27	2.71	8.5	8.00	14.	5.
GCA S.E.	7	1.00	1.07	2.0	2.00	4.	1.
GCA NO GYRO	11	1.73	0.79	2.0	1.00	3.	1.
MISSED APP	22	0.95	0.38	0.8	1.00	2.	0.
S.E. MISSED APP	9	0.10	0.10	0.1	0.00	0.	0.

APPENDIX B

T-37 CONTACT

STUDY I AT WILLIAMS AFB

ABBREVIATION OR PHRASE	MEANING
GRND OPS	GROUND OPERATIONS
TAKEOFF	TAKEOFF
T.O. CLIMB	TECH ORDER CLIMB
LEVEL OFF	LEVEL OFF
ST PWR ST	STRAIGHT AHEAD POWER ON STALL
T PWR ST	TURNING POWER ON STALL
PO TPS	PITCHOUT TRAFFIC PATTERN STALL
NH TPS	NOSE HIGH " " "
NL TPS	NOSE LOW " " "
L TPS	LANDING " " "
SLOW FLT	SLOW FLIGHT
SPIN PREV	SPIN PREVENTION
SPIN	SPIN
INV RECV	INVERTED RECOVERY
DIVE RECV	HIGH SPEED DIVE RECOVERY
VERT RECV	VERTICAL "
30 TURN	30° BANK TURN
45 TURN	45° " "
60 TURN	60° " "
TIME ST+L	TIME STRAIGHT AND LEVEL
MAX C TURN	MAXIMUM PERFORMANCE CLIMBING TURN
L-8	LAZY EIGHT
LOOP	LOOP
A.R.	AILERON ROLL
B.R.	BARRELL "
C-8	CUBAN EIGHT
IMM	IMMELMAN
C-L	CLOVER LEAF
SPLITS	SPLIT-S
HP ST-IN NORM	HEADPIN STRAIGHT-IN NORMAL
HP ST-IN NORM LDG	" " " Landing
HP ST IN NO FLAP LDG	" " NO-FLAP LANDING
HP ST-IN NO FLAP	" " "
HP OVH NORM PAT	" OVERHEAD NORMAL PATTERN
HP OVH NORM PAT LDG	" " " " & LANDIN(
HP SS PAT	" SIMULATED SINGLE ENGINE PATTERN
HP SS PAT LDG	" " " " PATTERN
	AND LANDING
HP CLOSED	HEADPIN CLOSED PATTERN
HP GO-AROUND	" GO-AROUND
HP ST. TURN	" STEEP TURNS

ABBREVIATION OR PHRASE	MEANING
WMS NORM PAT	WILLIAMS NORMAL PATTERN
WMS NORM PAT LDG	" " " & LANDING
WMS SS PAT	" SIMULATED SINGLE ENGINE PATTERN
WMS SS PAT LDG	" " " " PATTERN AND LANDING
WMS CLOSED	WILLIAMS CLOSED PATTERN
WMS GO AROUND	" GO AROUND
WMS ST TURN	" STEEP TURNS

NOTE: Abbreviations and phrases are identical in Craig and Williams Study except for Contact at Williams which is listed above.

MANEUVER ABBREVIATIONS

T-37 CONTACT
STUDY II AT CRAIG AFB

ABBREVIATION OR PHRASE	MEANING
GRD OPS	GROUND OPERATIONS
TAKEOFF	TAKEOFF
T.O. CLIMB	TECH ORDER CLIMB
LEVEL OFF	LEVEL OFF
ST PWR ST	STRAIGHT AHEAD POWER ON STALL
PWR ST	TURNING POWER ON STALL
P. O. TPS	PITCH OUT TRAFFIC PATTERN STALL
NH TPS	NOSE HIGH TRAFFIC PATTERN STALL
NL TPS	NOSE LOW TRAFFIC PATTERN STALL
L TPS	LANDING TRAFFIC PATTERN STALL
SLOW FLT	SLOW FLIGHT
SPIN PREV	SPIN PREVENTION
SPIN	SPIN
INV RECV	INVERTED RECOVERY
DIVE RECV	HIGH SPEED DIVE RECOVERY
VERT RECV	VERTICAL RECOVERY
MAX C TURN	MAXIMUM PERFORMANCE CLIMBING TURN
L-8	LAZY-EIGHT
LOOP	LOOP
A-R	AILERON ROLL
B-R	BARRELL ROLL
C-8	CUBAN 8
IMM	IMMELMAN
CL	CLOVERLEAF
SPLIT-S	SPLIT-S
ST-IN NORM	STRAIGHT IN NORMAL
ST IN NORMAL LANDING	STRAIGHT IN NORMAL LANDING
OVH NORM PAT RT	OVERHEAD NORMAL PATTERN RIGHT
OVH NORM LANDING RT	OVERHEAD NORMAL LANDING RIGHT
OVH SS PAT RT	OVERHEAD SIMULATED SINGLE ENGINE RIGHT
OVH SS LANDING RT	OVERHEAD NORMAL SIMULATED SINGLE ENGINE RIGHT LANDING
OVH NORM PAT LT	OVERHEAD NORMAL PATTERN LEFT
OVH NORM LANDING LT	OVERHEAD NORMAL LANDING LEFT
OVH SS PAT LT	OVERHEAD SIMULATED SINGLE ENGINE LEFT
OVH SS LANDING LT	OVERHEAD NORMAL SIMULATED SINGLE ENGINE LEFT LANDING
CLOSED-RT	CLOSED PATTERN - RIGHT
GO AROUND	GO AROUND
CLOSED LT	CLOSED PATTERN - LEFT
MID PHASE	MID-PHASE CHECK SCORE
FINAL CONTACT	FINAL CONTACT CHECK SCORE

T-37 INSTRUMENTS

ITO	INSTRUMENT TAKEOFF
CAS CLIMB	CONSTANT AIRSPEED CLIMB
T.O. CLIMB	TECH ORDER CLIMB
L.O.	LEVEL OFF
CAS DESCENT	CONSTANT AIRSPEED DESCENT
RATE CLIMB	RATE CLIMB
RATE DESCENT	RATE DESCENT
CHG A/S	CHANGE OF AIRSPEED
TURNS TO HDG	TURNS TO HEADING
S TURN 45°	STEEP TURN 45° OF BANK
S TURN 60°	STEEP TURN 60° OF BANK
TIME ST & L	TIME STRAIGHT & LEVEL
VERT S A	VERTICAL S A
B	VERTICAL S B
C	VERTICAL S C
D	VERTICAL S D
UN ATT	UNUSUAL ATTITUDE
A. ROLL	AILERON ROLL
W. OVER	WING OVER
O INTERCEPT	OUTBOUND COURSE INTERCEPT RMI AND CDI
I INTERCEPT	INBOUND COURSE INTERCEPT RMI AND CDI
O RMI ONLY	OUTBOUND COURSE INTERCEPT RMI ONLY
I RMI ONLY	INBOUND COURSE INTERCEPT RMI ONLY
HOLDING	HOLDING
PENETRATION	PENETRATION
LOW APP	LOW APPROACH
MISSED APP	MISSED APPROACH
NORM. PATTERN	NORMAL OVERHEAD PATTERN
NORMAL LANDING	NORMAL OVERHEAD LANDING
GO-AROUND	GO-AROUND
CLOSED	CLOSED
* BREAKOUT	BREAKOUT

T-37 NAVIGATION

ATC CLEARANCE	ATC CLEARANCE
RADAR DEP	RADAR DEPARTURE
SID DEP	STANDARD INSTRUMENT DEPARTURE
FIX/CHECK PT	FIX/CHECK POINT
HOLDING	HOLDING
PENETRATION	PENETRATION
LOW APP	VOR LOW APPROACH

T-37 FORMATION

GND OPS	GROUND OPERATIONS
VISUAL SIG	VISUAL SIGNALS
PATTERN	PATTERN
LANDING	LANDING
POS CHG	POSITION CHANGE
TAKEOFF (WING)	TAKEOFF AS WING
CLB & L.O. (WING)	CLIMB & LEVEL OFF AS WING
ST & L (WING)	STRAIGHT & LEVEL AS WING
TURNS (WING)	TURNS AS WING
CLB & DESC (WING)	CLIMBS & DESCENTS AS WING
CROSS UND (WING)	CROSS UNDERS AS WING
PWR CONT (WING)	POWER CONTROL AS WING
REJOINS (WING)	REJOINS AS WING
TIME ENT AREA	TIME ENTER AREA
TIME EXT AREA	TIME EXIT AREA
TAKEOFF (LEAD)	TAKEOFF AS LEAD
CLIMB (LEAD)	CLIMB AS LEAD
LEVEL OFF (LEAD)	LEVEL OFF AS LEAD
WING CONSID (LEAD)	WING CONSIDERATION AS LEAD
P.O. & REJ (LEAD)	PITCHOUT AND REJOIN AS LEAD
TRAF ENT (LEAD)	TRAFFIC ENTRY AS LEAD

T-38 CONTACT

ABBREVIATION OR PHRASE	MEANING
GND OPS	GROUND OPERATIONS
TAKEOFF	TAKEOFF
CLIMB	CLIMB
L.O.	LEVEL OFF
TURNS	TURNS
TP STALL FF	TRAFFIC PATTERN STALLS FULL FLAP
TP STALL NF	TRAFFIC PATTERN STALLS NO FLAP
AFT STICK N	FULL AFT STICK STALL - NORMAL RECOVERY
AFT STICK 85	FULL AFT STICK STALL - 85% RECOVERY
SLO FLT	SLOW FLIGHT
CLOVERLEAF	CLOVERLEAF
CUBAN 8	CUBAN 8
BARREL ROLL	BARREL ROLL
IMMELMANN	IMMELMANN
CHANDELLE	CHANDELLE
LAZY 8	LAZY 8
SPLIT S	SPLIT S
AIL ROLL	AILERON ROLL
LOOP	LOOP
VERT RCVY	VERTICAL RECOVERY
HI SP DIVE	HIGH SPEED DIVE
N PAT & P/O	NORMAL PATTERN & PITCHOUT
N FIN TURN	NORMAL FINAL TURN
N FIN APP	NORMAL FINAL APPROACH
NORM TD	NORMAL TOUCHDOWN
GO AROUND	GO AROUND
CLOSED	CLOSED PATTERN
SE PATTN	SINGLE ENGINE PATTERN
SE FINAL	SINGLE ENGINE FINAL APPROACH
SE TD	SINGLE ENGINE TOUCHDOWN
SE GO	SINGLE ENGINE GO-AROUND
NF PAT P/O	NO FLAP PATTERN & PITCHOUT
NF FIN TRN	NO FLAP FINAL TURN
NF FIN APP	NO FLAP FINAL APPROACH
NF TD	NO FLAP TOUCHDOWN
HVY PATN	HEAVYWEIGHT SINGLE ENGINE PATTERN
HVY LDG	HEAVYWEIGHT SINGLE ENGINE LANDING
HVY GO	HEAVYWEIGHT SINGLE ENGINE GO-AROUND
FINAL CONTACT	FINAL CONTACT CHECK SCORE

T-38 INSTRUMENTS

ABBREVIATION OR PHRASE	MEANING
GND OPS	GROUND OPERATIONS
ITO	INSTRUMENT TAKEOFF
CLIMB	CLIMB
SID	STANDARD INSTRUMENT DEPARTURE
L.O.	LEVEL OFF
TRN HDG	TURNS TO HEADING
ST B&R	
CHG A/S S&L	CHANGE AIRSPEED STRAIGHT AND LEVEL
CHG A/S TURN	CHANGE AIRSPEED IN TURNS
CAS CLB	CONSTANT AIRSPEED CLIMB
CAS DES	CONSTANT AIRSPEED DESCENT
RATE CLB	RATE CLIMB
RATE DES	RATE DESCENT
VERT SA	VERTICAL S A-PATTERN
VERT SB	VERTICAL S B-PATTERN
VERT SC	VERTICAL S C-PATTERN
VERT SD	VERTICAL S D-PATTERN
S TURN 45°	STEEP TURN 45 DEGREES
S TURN 60°	STEEP TURN 60 DEGREES
S TURN TAC	TACTICAL STEEP TURN
SLO FLT	SLOW FLIGHT
AIL ROLL	AILERON ROLL
WINGOVER	WINGOVER
UN ATT	UNUSUAL ATTITUDE
FIX FIX	FIX TO FIX (VIA DIRECT)
INT MAIN COR	INTERCEPT AND MAINTAIN COURSE
HOMING	HOMING
ARC	ARC INTERCEPT
HOLDING	HOLDING
PEN	PENETRATION
ENROUTE	ENROUTE DESCENT
TAC APP	TACAN APPROACH
ILS	INSTRUMENT LANDING SYSTEM
ILS MAN	ILS MANUAL
ILS S. E.	ILS SINGLE ENGINE
GCA	GROUND CONTROL APPROACH
GCA S. E.	GROUND CONTROL APPROACH - SINGLE ENGINE
GCA NO GYRO	GROUND CONTROL APPROACH - NO GYRO
MISSED APP	MISSED APPROACH
SE MISS APP	SINGLE ENGINE MISSED APPROACH
FINAL NAV CHECK	FINAL NAVIGATION CHECK SCORE

LD FROM L APP	LANDING FROM LOW APPROACH
MISSED APP	VOR MISSED APPROACH
ENROUTE D.	ENROUTE DESCENT
GCA PAT	GCA PATTERN
LD FROM GCA	LANDING FROM GCA
MISSED APP	MISSED APPROACH
VFR LANDING	VFR LANDING
TRANS. WX-V (DURING APP)	TRANSITION FROM WEATHER TO VFR DURING AN APPROACH

T-38 NAVIGATION

ABBREVIATION OR PHRASE	MEANING
CLNC	ATC CLEARANCE
RADAR DEP	RADAR DEPARTURE
SID	STANDARD INSTRUMENT DEPARTURE
HOLDING	HOLDING
PEN	PENETRATION
TAC APP	TACAN APPROACH
GCA	GROUND CONTROL APPROACH
ILS	INSTRUMENT LANDING SYSTEM
ENROUTE DES	ENROUTE DESCENT
VFR PAT LDG	VFR PATTERN & LANDING
INST LDG	LANDING FROM AN INSTRUMENT APPROACH
CIRC APP	CIRCLING APPROACH
MISSED APP	MISSED APPROACH

T-38 2-SHIP FORMATION

ABBREVIATION OR PHRASE	MEANING
GND OPS	GROUND OPERATIONS
TFC PATN	TRAFFIC PATTERN
LDG	LANDING
T.O.	TAKEOFF
CLIMB	CLIMB OUT
CROSS UND	CROSSUNDER
ROUTE	ROUTE
ECH TURN	ECHELON TURN
PITCHOUT	PITCHOUT
TRN RJ	TURNING REJOIN
ST RJ	STRAIGHT-AHEAD REJOIN
#3 RJ	REJOIN TO #3 POSITION
OVERSHOOT	OVERSHOOT
TRAIL	TRAIL
INST APP	INSTRUMENT APPROACH
T.O. WING (POSITION CHANGE)	POSITION CHANGE TO WING
T.O. LEAD (POSITION CHANGE)	POSITION CHANGE TO LEAD
T.O. (AS LEAD)	TAKEOFF AS LEAD
CLIMB (AS LEAD)	CLIMB AS LEAD
L.O. (AS LEAD)	LEVEL OFF AS LEAD
PO & TRJ (AS LEAD)	PITCHOUT AND TURNING REJOIN LEAD
PO & SRJ (AS LEAD)	PITCHOUT AND STRAIGHT AHEAD REJOIN LEAD
ECH TURN (AS LEAD)	ECHELON TURN AS LEAD
TRAIL (AS LEAD)	TRAIL AS LEAD
DES OR PEN (AS LEAD)	DESCENT OR PENETRATION AS LEAD
TFC ENT (AS LEAD)	TRAFFIC ENTRY AS LEAD
INST APP (AS LEAD)	INSTRUMENT APPROACH AS LEAD
VISUAL SIG	VISUAL SIGNALS
POS CHG	POSITION CHANGE
PWR CONT	POWER CONTROL
WING CONSID	WINGMAN CONSIDERATION
PO & REJ	PITCHOUT AND REJOIN
TRAF ENT	TRAFFIC ENTRY
FINAL 2-SHIP CHECK	FINAL 2-SHIP CHECK SCORE

T-38 4-SHIP FORMATION

ABBREVIATION OR PHRASE	MEANING
GND OPS	GROUND OPERATIONS
TFC PATN	TRAFFIC PATTERN
LDG	LANDING
T.O.	TAKEOFF
JOIN 3	JOINUP OUT OF TRAFFIC AS #3
CLIMB	CLIMBOUT
TIME FT 2 & 3	TIME IN FINGERTIP AS 2 & 3
TIME FT 4	TIME IN FINGERTIP AS 4
ECH AS 2	ECHELON TURNS AS #2
ECH AS 3 & 4	ECHELON TURNS AS 3 & 4
ROUTE	ROUTE
PITCHOUT	PITCHOUT
TURN RJ 2 & 4	TURNING REJOINS AS 2 & 4
TURN RJ 3	TURNING REJOIN AS 3
ST RJ 2 & 4	STRAIGHT AHEAD REJOINS AS 2 & 4
ST RJ 3	STRAIGHT AHEAD REJOINS AS 3
OVERSHOOT	OVERSHOOT
CROSS 2	CROSSUNDER AS #2
CROSS 3	CROSSUNDER AS #3
CROSS 4	CROSSUNDER AS #4
EL P/C LEAD	ELEMENT POSITION CHANGE AS LEAD
EL P/C 3	ELEMENT POSITION CHANGE AS 3
EC P/C LEAD	ECHELON POSITION CHANGE AS LEAD
EC P/C 2	ECHELON POSITION CHANGE AS 2
PO & T RJ	PITCHOUT & TURNING REJOIN LEAD
PO & S RJ	PITCHOUT & STRAIGHT AHEAD REJOIN LEAD
DES	DESCENT
TFC ENT	TRAFFIC ENTRY

Table C1. **T-37 Contact Results for Repetitions to Proficiency Data: Study II at Craig AFB (32 Students)**

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
[illegible]	32	0.59	1.03	1.0	0.00	10.	0.
[illegible]	32	17.19	7.15	17.0	21.00	35.	5.
TO CLIMB	32	10.16	4.84	9.5	9.00	23.	1.
LEVEL OFF	32	21.00	11.01	21.0	24.00	48.	4.
ST [illegible] ST	32	10.75	5.20	11.0	13.00	24.	2.
[illegible] ST	32	1.22	3.84	0.0	0.00	18.	0.
PU IPS	32	4.25	3.45	3.0	10.00	14.	0.
SR IPS	32	0.31	2.21	0.0	0.00	14.	0.
RL IPS	32	0.75	3.01	0.0	0.00	17.	0.
L IPS	32	1.25	1.92	1.0	1.00	11.	0.
SLO. FLIGHT	32	0.25	2.20	0.0	0.00	13.	0.
SPIN RECOV	32	4.91	1.99	5.0	5.00	10.	1.
SPIN	32	4.53	2.12	4.0	3.00	10.	1.
INV RECOV	32	3.38	2.30	3.0	3.00	11.	1.
DIVE RECOV	32	0.09	2.47	0.0	0.00	11.	1.
VERT RECOV	32	5.12	3.13	4.5	4.00	18.	1.
MAX C TURN	32	2.47	1.41	2.0	2.00	7.	1.
L-8	32	2.12	1.31	3.0	3.00	6.	1.
LOOP	32	2.38	1.13	2.0	2.00	5.	1.
4-R	32	2.53	1.22	2.5	3.00	5.	1.
8-R	31	3.16	1.80	3.0	3.00	9.	1.
L-8	32	3.09	1.07	3.0	4.00	7.	1.
IMM	32	2.34	1.01	2.0	3.00	5.	1.
L-L	31	2.97	1.76	3.0	3.00	8.	1.
SPLIT-S	32	2.00	1.02	2.0	2.00	5.	1.
SI-IN NORMAL	31	3.26	1.08	4.0	4.00	5.	2.
SI-IN NORMAL LANDING	31	2.94	0.96	3.0	3.00	6.	2.
OVH NORM PAT-RT	32	17.91	5.11	17.0	20.00	31.	10.
OVH NORM LAN-RT	32	16.19	5.16	16.5	17.00	27.	1.
SS-PAT-RT	32	5.09	2.29	4.5	4.00	12.	2.
SS-LAN-RT	32	4.38	2.42	4.0	4.00	13.	1.
OVH NORM PAT-LT	31	14.87	5.31	14.0	12.00	34.	5.
OVH NORM LAN-LT	31	13.16	5.25	13.0	13.00	23.	2.
SS PAT-LT	32	4.12	2.25	4.0	5.00	11.	2.
SS LAN-LT	32	4.34	2.33	4.0	3.00	10.	1.
CLOSED-RT	32	1.81	4.04	1.0	4.00	15.	1.
GO AROUND	32	0.81	3.56	0.0	1.00	15.	2.
CLOSED-LT	31	1.81	0.15	0.0	3.00	46.	2.
MID PHASE	32	80.19	5.80	81.4	85.00	94.	68.
FINAL CONTACT	32	97.06	1.32	98.1	91.00	97.	91.

Table C2. **T-37 Contact Results for Total Number of Repetitions Data: Study II at Craig AFB (25 Student)**

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
GRD OPS	25	50.00	2.10	50.0	40.00	42.	34.
TAKE OFF	25	92.12	11.28	94.0	120.00	130.	63.
TO CLIMB	25	44.30	9.08	43.0	33.00	65.	29.
LEVEL OFF	25	87.00	14.08	93.0	63.00	121.	52.
ST PWR ST	25	21.60	1.49	22.0	23.00	24.	12.
T P R ST	25	17.12	0.37	15.0	17.00	38.	8.
PO TPS	25	16.40	4.34	17.0	17.00	27.	10.
HM TPS	25	20.36	3.34	21.0	22.00	30.	14.
HL TPS	25	21.24	4.20	21.0	20.00	35.	14.
L TPS	25	16.00	3.34	16.0	16.00	24.	12.
SLOW FLIGHT	25	17.92	3.04	17.0	17.00	25.	12.
SPIN PREV	25	17.00	4.39	17.0	17.00	28.	11.
SPIN	25	12.24	3.04	10.0	9.00	20.	8.
INV RECOV	25	17.36	4.31	16.0	15.00	28.	9.
DIVE RECOV	25	17.08	4.12	16.0	15.00	28.	11.
VERT RECOV	25	16.24	0.00	17.0	16.00	33.	0.
MAX C TURN	25	13.84	4.62	13.0	13.00	25.	5.
L-8	25	16.24	3.00	16.0	20.00	30.	5.
LOOP	25	15.16	3.28	16.0	16.00	22.	1.
A-R	25	14.36	4.12	14.0	14.00	27.	1.
O-R	25	15.92	3.15	16.0	16.00	29.	0.
L-S	25	14.00	1.24	13.0	13.00	18.	5.
IMM	25	14.04	3.17	13.0	13.00	30.	8.
L-L	25	15.36	3.96	15.0	15.00	24.	4.
SPLIT-S	25	14.44	10.28	12.0	10.00	60.	5.
SI-IN NORMAL	25	11.00	3.15	10.0	8.00	18.	7.
SI-IN NORMAL LANDING	25	10.24	3.07	9.0	8.00	18.	8.
OVH NORM PAT-RT	25	49.64	6.03	51.0	58.00	64.	33.
OVH NORM LAN-RT	25	42.24	7.19	41.0	45.00	60.	28.
SS-PAT-RT	25	18.08	3.01	15.0	19.00	27.	9.
SS-LAN-RT	25	15.24	8.69	14.0	14.00	38.	8.
OVH NORM PAT-LT	25	38.76	11.38	39.0	45.00	74.	12.
OVH NORM LAN-LT	25	33.48	10.20	33.0	40.00	58.	13.
SS PAT-LT	25	13.56	8.34	12.0	12.00	33.	5.
SS LAN-LT	25	12.32	5.32	11.0	11.00	29.	8.
CLOSED-RT	25	17.12	8.29	17.0	20.00	35.	8.
GO AROUND	25	15.84	3.41	13.0	13.00	28.	8.
CLOSED-LT	24	13.17	4.30	14.0	18.00	19.	5.

Table C3. **T-37 Instrument (Aircraft) Results for Repetions to Proficiency Data: Study II at Craig AFB (31 Students)**

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
GRD OPS	30	2.27	1.26	2.0	2.00	5.	1.
ITO	30	3.97	1.81	4.0	4.00	10.	1.
CAS CLIMB	30	5.67	3.01	6.0	4.00	12.	1.
TO CLIMB	30	4.40	2.06	4.0	4.00	10.	1.
- 0	30	9.13	4.95	9.5	10.00	18.	1.
CAS DESCENT	30	6.97	3.82	7.0	7.00	14.	1.
RATE CLIMB	29	4.33	2.65	4.0	7.00	11.	1.
RATE DESCENT	30	4.63	2.51	4.0	4.00	11.	1.
CHG A/S	30	7.33	3.91	7.0	9.00	16.	1.
TURNS TO HDG	28	11.61	6.94	10.5	22.00	23.	1.
S TURN 45	28	4.11	3.88	3.0	3.00	19.	1.
S TURN 60	30	5.40	3.15	5.0	5.00	13.	1.
VERT S A	28	3.79	1.95	3.0	3.00	8.	1.
VERT S B	12	2.17	1.40	2.0	1.00	5.	1.
VERT S C	9	1.67	1.00	1.0	1.00	4.	1.
VERT S D	25	3.76	2.15	3.0	2.00	11.	1.
UN ATT	30	5.17	3.18	5.0	5.00	16.	1.
A ROLL	30	4.10	2.11	4.0	4.00	10.	1.
A OVER	30	5.07	2.38	5.0	3.00	9.	1.
O INTERCEPT	28	3.82	2.26	3.5	2.00	8.	1.
I INTERCEPT	28	4.04	2.22	4.0	2.00	10.	1.
RMI ONLY O	26	2.62	1.63	2.0	1.00	7.	1.
RMI ONLY I	27	2.48	1.40	2.0	2.00	7.	1.
HOLDING	27	4.81	2.34	4.0	3.00	13.	2.
PENETRATION	27	4.93	1.84	4.0	4.00	9.	2.
LOW ADD	27	5.81	2.47	6.0	5.00	12.	3.
MISSED ADD	27	6.22	2.62	6.0	4.00	12.	2.
NORM PATTERN	21	6.38	2.36	6.0	9.00	14.	5.
NORM LANDING	21	2.29	0.85	2.0	2.00	5.	1.

Table C4. **T-37 Instrument (Aircraft) Results for Total Number of Repetition Data: Study II at Craig AFB (24 Students)**

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
GRD OPS	24	16.87	1.15	17.0	17.00	19.	15.
IIU	24	17.00	1.25	17.0	17.00	20.	15.
CAS CLIMB	24	20.71	4.94	20.0	25.00	28.	11.
TO CLIMB	24	16.87	5.64	16.0	18.00	42.	10.
L O	24	36.96	10.20	34.0	38.00	60.	23.
CAS DESCENT	24	22.92	7.87	22.0	22.00	39.	10.
RATE CLIMB	24	16.75	5.29	17.5	18.00	26.	5.
RATE DESCENT	24	17.54	6.45	16.0	16.00	33.	7.
CHG A/S	24	28.58	8.76	27.0	20.00	48.	14.
TURNS TO HDG	24	34.50	13.79	32.0	39.00	65.	3.
S TURN 45	24	11.29	6.20	10.5	12.00	31.	3.
S TURN 90	24	17.37	4.79	16.0	22.00	26.	7.
VERT S A	24	11.58	4.70	10.5	11.00	26.	5.
VERT S B	24	3.04	2.39	2.0	0.00	11.	0.
VERT S C	20	2.20	1.77	2.0	2.00	6.	0.
VERT S D	23	10.52	2.83	10.0	10.00	15.	6.
UN ATT	24	20.12	8.40	21.5	22.00	35.	3.
A ROLL	24	16.62	2.83	17.0	18.00	21.	9.
A OVER	24	17.25	3.59	17.0	13.00	26.	13.
U INTERCEPT	24	11.37	4.42	10.0	10.00	22.	5.
I INTERCEPT	24	10.50	3.60	10.0	10.00	19.	4.
RMI ONLY O	24	5.46	2.93	6.0	0.00	11.	0.
RMI ONLY I	24	7.38	2.92	7.0	7.00	15.	3.
HOLDING	24	9.00	2.27	9.0	9.00	14.	3.
PENETRATION	24	10.50	2.27	10.0	10.00	15.	7.
LOW ADD	24	11.04	2.71	10.0	9.00	19.	7.
MISSED ADD	24	12.83	3.13	13.5	11.00	19.	7.
NORM PATTERN	24	8.50	3.34	8.5	10.00	15.	1.
NORM LANDING	24	8.54	3.15	7.5	0.00	12.	0.
GO AROUND	21	1.05	1.20	1.0	1.00	5.	0.
CLOSED	20	1.50	2.09	1.0	2.00	9.	0.
GCA PATTERN	20	14.05	4.27	14.5	18.00	19.	1.
LANDING FROM GCA	17	8.29	2.69	9.0	9.00	14.	4.

Table C5. **T-37 Instrument (Trainer) Results for Repetitions to Proficiency Data: Study II at Craig AFB (35 Students)**

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
GRD UPS	34	2.74	1.19	2.0	2.00	5.	1.
ITO	34	8.18	2.15	8.0	8.00	12.	3.
CAS CLIMB	34	8.47	2.49	9.0	10.00	13.	3.
TO CLIMB	34	8.47	2.62	8.0	8.00	13.	2.
L O	34	11.74	3.93	11.5	11.00	21.	3.
CAS DESCENT	33	8.52	3.52	9.0	7.00	16.	3.
RATE CLIMB	33	7.58	3.34	8.0	9.00	15.	1.
RATE DESCENT	33	7.64	3.77	7.0	10.00	15.	2.
CHG A/S	34	12.94	4.66	12.5	15.00	21.	4.
TURNS TO MOD	33	11.70	0.00	12.0	13.00	26.	2.
S TURN 45	34	5.47	2.40	8.0	8.00	11.	1.
S TURN 60	33	8.55	3.42	10.0	10.00	14.	2.
VERT SA	34	8.59	3.55	8.5	7.00	17.	1.
VERT SB	27	3.59	1.65	4.0	4.00	7.	1.
VERT SC	24	3.40	2.50	3.0	1.00	9.	1.
VERT SD	31	7.61	3.57	7.0	11.00	19.	1.
ON ATT	33	13.52	4.80	13.0	10.00	25.	7.
A ROLL	34	10.44	4.55	10.0	13.00	25.	1.
A OVER	34	12.20	4.69	13.0	17.00	20.	3.
U INTERCEP.	32	4.87	2.70	4.5	5.00	12.	1.
I INTERCEPT	32	5.00	2.63	5.0	4.00	12.	1.
RMI ONLY U	31	3.26	1.71	3.0	2.00	7.	1.
RMI ONLY I	31	3.81	1.60	4.0	5.00	6.	1.
HOLDING	30	4.10	2.02	4.0	4.00	10.	1.
PENETRATION	31	3.74	1.48	3.0	3.00	7.	1.
LOW ADD	31	4.35	1.80	4.0	3.00	8.	1.
MISSED ADD	30	4.97	2.14	5.0	8.00	9.	2.
GCA PATTERN	10	3.90	1.45	4.0	4.00	6.	2.

Table C6. **T-37 Instrument (Trainer) Results for Total Number of Repetitions Data: Study II at Craig AFB (26 Students)**

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
GRD OPS	23	18.43	1.12	18.0	18.00	21.	17.
ITJ	23	22.35	1.94	23.0	21.00	25.	18.
CAS CLIMB	23	25.78	4.58	25.0	23.00	35.	18.
IO CLIMB	23	21.48	2.09	22.0	24.00	25.	18.
L O	23	47.04	7.97	47.0	40.00	65.	31.
CAS DESCENT	23	25.78	5.58	24.0	27.00	41.	18.
RATE CLIMB	23	20.34	4.25	20.0	21.00	30.	13.
RATE DESCENT	23	21.48	5.34	22.0	29.00	31.	12.
CHG A/S	23	37.35	6.47	36.0	41.00	47.	23.
TURNS TO HDG	23	44.87	8.87	44.0	55.00	63.	31.
S TURN 45	23	12.26	3.78	13.0	7.00	18.	6.
S TURN 60	23	17.57	4.20	17.0	17.00	27.	9.
VERT SA	23	15.22	4.76	15.0	15.00	26.	6.
VERT SB	23	5.13	3.14	5.0	5.00	14.	1.
VERT SC	20	5.35	3.00	4.5	5.00	14.	2.
VERT SD	23	12.35	4.47	13.0	13.00	22.	4.
UN ATT	23	29.74	4.17	31.0	32.00	35.	17.
A ROLL	23	25.87	5.65	26.0	31.00	36.	14.
A OVER	23	27.48	5.13	27.0	27.00	39.	21.
U INTERCEPT	23	18.43	4.56	17.0	18.00	26.	7.
I INTERCEPT	23	15.91	3.74	16.0	20.00	22.	9.
RMI ONLY U	23	8.00	2.63	8.0	8.00	15.	4.
RMI ONLY I	23	8.91	2.31	9.0	7.00	15.	5.
HOLDING	23	11.57	3.31	11.0	10.00	18.	4.
PENETRATION	23	9.39	2.35	9.0	10.00	19.	7.
LOW ADD	23	10.09	1.98	10.0	11.00	15.	7.
MISSED ADD	23	11.96	2.57	12.0	11.00	16.	8.
GCA PATTERN	15	5.47	2.42	5.0	4.00	11.	2.

Table C7. **T-37 Formation Results for Repetitions to Proficiency Data: Study II at Craig AFB (21 Students)**

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
WING T.O.	13	2.85	.69	3.0	3.00	4.	2.
CLIMB-L.O.	20	3.35	1.04	3.0	3.00	6.	2.
STRT-LEVEL	18	3.78	1.80	3.5	3.00	8.	1.
TURNS	19	7.11	4.25	6.0	4.00	20.	3.
CLIMBS/DESCENTS	21	4.95	1.63	5.0	5.00	9.	3.
CROSSUNDER	20	5.55	2.14	6.0	7.00	10.	2.
POWER CONTROL	8	4.38	1.69	4.5	5.00	7.	2.
REJOINS	19	4.21	1.08	4.0	4.00	6.	3.
LEAD T.O.	20	1.40	.85	2.0	2.00	4.	1.
CLIMB	21	2.62	1.36	2.0	2.00	5.	1.
LEVEL OFF	20	3.20	1.67	3.0	2.00	7.	1.
WING CONSIDERATION	5	3.00	1.22	3.0	3.00	5.	2.
PITCHOUT/REJOIN	19	2.16	.90	2.0	2.00	4.	1.
LETDOWN	11	2.45	1.13	2.0	3.00	5.	1.
GROUND OPS	21	1.71	.64	2.0	2.00	3.	1.
VISUAL SIGNALS	21	3.14	1.82	3.0	2.00	9.	1.
TRAFFIC PATTERN	21	1.45	1.24	2.0	2.00	5.	1.
LANDING	21	1.48	.81	1.0	1.00	4.	1.
POSITION CHANGE	21	2.76	1.22	2.0	2.00	5.	1.

Table C8. **T-37 Formation Results for Total Number of Repetitions Data: Study II at Craig AFB (21 Students)**

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
WING T.O.	21	3.48	.87	3.0	4.00	6.	2.
CLIMB-L.O.	21	6.00	1.56	6.0	6.00	9.	3.
STRT-LEVEL	18	8.61	2.50	8.0	7.00	14.	5.
TURNS	21	12.71	5.26	13.0	8.00	28.	5.
CLIMBS/DESCENTS	21	10.67	3.50	10.0	8.00	20.	6.
CROSSUNDER	21	10.90	3.43	10.0	10.00	18.	4.
POWER CONTROL	15	8.60	3.50	8.0	10.00	18.	4.
REJOINS	21	7.67	2.56	8.0	7.00	14.	2.
LEAD T.O.	21	3.90	1.64	4.0	4.00	10.	1.
CLIMB	21	6.71	2.61	7.0	7.00	17.	3.
LEVEL OFF	21	7.81	2.46	8.0	8.00	15.	3.
WING CONSIDERATION	10	7.20	2.30	6.0	6.00	11.	5.
PITCHOUT/REJOIN	21	8.05	2.38	8.0	9.00	13.	3.
LETDOWN	20	4.05	2.01	4.0	5.00	8.	1.
GROUND OPS	21	6.00	.95	6.0	6.00	8.	4.
VISUAL SIGNALS	21	9.05	3.93	8.0	6.00	19.	3.
TRAFFIC PATTERN	21	7.43	1.57	7.0	7.00	11.	5.
LANDING	21	7.52	2.04	7.0	7.00	15.	5.
POSITION CHANGE	21	6.38	1.36	6.0	6.00	9.	4.

Table C9. **T-37 Formation Results for Number of Repetitions to Proficiency Results: Study II at Craig AFB (32 Students)**

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
GND OPS	32	3.28	2.33	3.0	1.00	10.	1.
TAKE OFF	32	5.28	3.34	4.0	4.00	16.	1.
CLIMB	32	4.19	2.02	4.0	4.00	10.	1.
L.O.	32	5.03	3.44	4.0	4.00	14.	1.
TURNS	30	5.03	1.33	3.0	1.00	41.	1.
FN TN FF SIL	32	1.09	3.03	0.0	0.00	15.	2.
ST AND FF SIL	31	0.16	2.49	0.0	5.00	11.	2.
FN TN NF SIL	16	2.25	1.06	2.0	2.00	4.	1.
ST AND NF SIL	15	2.00	1.00	2.0	2.00	4.	1.
AFT STICK SIL N	4	2.50	1.00	3.0	3.00	3.	1.
AFT STICK GO	5	1.20	0.45	1.0	1.00	2.	1.
SLO FLT	31	4.77	2.47	4.0	3.00	13.	1.
L-R	31	5.13	3.56	4.0	4.00	13.	1.
LOOP	30	2.27	1.05	2.0	2.00	5.	1.
A-R	32	2.31	1.55	2.0	1.00	7.	1.
B-R	30	4.53	3.12	4.0	3.00	17.	1.
L-B	31	2.97	1.38	3.0	2.00	7.	1.
IMM	31	3.10	1.78	3.0	3.00	10.	1.
L-L	26	5.08	3.19	5.5	6.00	16.	2.
SPLIT-S	25	2.36	1.10	2.0	2.00	5.	1.
CHANDELLE	28	3.01	1.81	3.0	3.00	9.	1.
VERT RCVY	31	2.97	1.45	2.0	2.00	6.	1.
MI SP DIVE RCVY	31	3.48	1.88	3.0	2.00	8.	1.
N PAT P/O	32	14.97	3.49	13.5	10.00	27.	3.
N FIN TURN	28	20.39	10.54	27.0	27.00	50.	9.
N FIN APP	31	23.90	9.70	20.0	20.00	53.	10.
NORM TD	29	22.97	8.25	23.0	32.00	39.	7.
GO AROUND	31	9.03	9.35	6.0	6.00	25.	4.
CLOSED	27	8.93	4.97	9.0	9.00	21.	3.
S.E. PATN	31	6.39	2.94	6.0	5.00	15.	2.
S.E. FINAL	29	7.45	3.13	7.0	5.00	16.	3.
S.E. TD	30	7.53	4.27	7.0	7.00	24.	2.
S.E. GO	21	2.00	0.89	2.0	2.00	4.	1.
NF PAT P/O	23	4.09	1.70	4.0	3.00	7.	1.
NF FIN TURN	14	8.50	2.14	8.0	8.00	11.	4.
NF FIN APP	28	8.64	3.09	8.0	8.00	16.	2.
NF TD	27	8.48	3.60	8.0	8.00	16.	2.
MVY PATN	15	3.13	2.03	3.0	1.00	7.	1.
MVY LDG	14	2.71	1.86	2.0	1.00	6.	1.
MVY GO	5	1.80	1.30	1.0	1.00	4.	1.
FINAL CONTACT	32	83.40	1.09	80.6	87.00	92.	82.

Table C10. **T-38 Contact Results for Total Number of Repetitions Data: Study II at Craig AFB (32 Students)**

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
GND OPS	32	31.50	4.02	30.0	30.00	43.	27.
TAKE OFF	32	42.44	13.99	37.5	32.00	81.	26.
CLIMB	32	33.28	6.31	31.0	29.00	53.	27.
L.O.	32	37.75	11.01	36.0	29.00	85.	27.
TURNS	32	36.22	40.28	32.0	205.00	243.	4.
FN TN FF STL	32	18.63	4.92	17.5	14.00	31.	12.
ST AND FF STL	32	16.41	3.99	16.0	16.00	27.	11.
FN TN NF STL	32	2.59	1.34	2.0	2.00	5.	1.
ST AND NF STL	31	2.13	1.15	2.0	2.00	5.	1.
AFT STICK STL N	24	1.33	.82	1.0	1.00	4.	1.
AFT STICK GO	20	1.25	.55	1.0	1.00	3.	1.
SLO FLT	32	13.09	3.05	13.0	12.00	20.	5.
L-R	32	19.59	4.40	20.0	24.00	28.	13.
LOOP	32	10.38	3.03	10.0	10.00	18.	4.
A-R	32	17.47	5.33	17.0	17.00	31.	8.
H-R	32	14.16	3.95	14.0	17.00	23.	5.
C-R	32	9.66	2.89	9.5	12.00	15.	4.
IMM	32	10.53	3.30	11.0	11.00	18.	4.
C-I	32	14.19	3.65	13.5	13.00	25.	7.
SPLIT-S	32	10.66	2.89	11.0	11.00	16.	4.
CHANDELLE	32	11.19	3.30	11.0	11.00	18.	5.
VERT RCVY	32	14.69	3.25	14.0	16.00	23.	10.
HI SP DIVE RCVY	32	14.13	3.01	14.0	16.00	22.	9.
N PAT P/O	32	57.94	12.89	57.5	56.00	86.	28.
N FIN TURN	32	70.94	16.22	68.0	60.00	112.	44.
N FIN APP	32	66.69	16.22	65.0	63.00	112.	42.
NORM TO	32	61.72	12.90	58.5	56.00	99.	40.
GO AROUND	32	23.28	8.26	21.5	19.00	43.	9.
CLOSED	32	21.75	6.76	22.0	23.00	47.	12.
S.F. PATN	32	20.94	5.99	19.0	17.00	38.	11.
S.F. FINAL	32	21.31	5.69	19.0	17.00	33.	13.
S.F. TO	32	18.69	5.45	18.0	18.00	34.	12.
S.F. GO	32	4.47	2.14	4.0	5.00	13.	1.
NF PAT P/O	32	9.59	4.96	9.0	9.00	24.	2.
NF FIN TURN	32	10.47	4.89	9.5	7.00	25.	2.
NF FIN APP	32	18.84	5.39	18.5	14.00	35.	12.
NF TO	32	17.50	5.54	16.0	20.00	36.	10.
HVY PATN	31	5.52	3.87	5.0	3.00	16.	1.
HVY LDG	30	5.20	3.01	5.0	6.00	11.	1.
HVY GO	20	2.35	1.31	2.0	2.00	5.	1.

Table C11. **T-38 Instrument (Aircraft) Results for Repetitions to Proficiency Data: Study II at Craig AFB (32 Students)**

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
GND UPS	31	4.39	1.75	5.0	5.00	8.	1.
ITO	29	5.86	2.09	6.0	4.00	9.	2.
CLIMB	31	4.06	1.81	4.0	4.00	8.	1.
SID	30	5.27	1.84	5.0	5.00	9.	3.
L.O.	31	7.10	3.27	7.0	7.00	14.	1.
IRN MOD	32	7.25	4.06	6.0	5.00	19.	2.
SI BAR	26	2.34	1.48	2.0	2.00	7.	1.
CHG A/S STGL	32	4.47	2.23	4.0	5.00	12.	2.
CHG A/S TURN	30	4.10	2.00	3.5	2.00	10.	1.
CAS CLIMB	29	3.17	1.34	3.0	2.00	7.	2.
CAS DESC	28	3.75	2.08	3.0	2.00	9.	1.
RATE CLMB	28	3.89	1.55	4.0	3.00	7.	1.
RATE DESC	28	3.75	1.76	3.5	2.00	8.	1.
VERT S A	23	4.23	2.10	4.0	4.00	9.	1.
VERT S B	25	3.33	1.57	3.0	4.00	7.	1.
VERT S C	15	2.07	1.28	2.0	1.00	5.	1.
VERT S D	16	3.25	2.11	3.0	3.00	9.	1.
S TURN 45 DEG	29	4.00	1.85	4.0	5.00	8.	1.
S TURN 60 DEG	26	7.04	3.35	8.0	8.00	15.	1.
S TURN TAC	12	1.75	0.97	1.5	1.00	4.	1.
SLO FLT	25	4.23	1.73	4.0	3.00	8.	2.
AIL ROLL	29	3.21	1.83	3.0	2.00	9.	1.
WING OVER	23	4.09	2.07	4.0	4.00	10.	1.
ON ATT	27	4.59	1.85	5.0	5.00	8.	1.
FIX FIX	24	7.38	3.17	7.5	7.00	13.	2.
MAIN COR	23	3.78	1.73	4.0	4.00	8.	1.
HOMING	13	1.38	0.51	1.0	1.00	2.	1.
ARC	21	3.00	1.38	3.0	3.00	6.	1.
HOLDING	20	3.70	1.42	4.0	5.00	7.	1.
PEN	19	4.11	1.79	4.0	5.00	7.	1.
ENROUTE DES	20	3.50	0.89	3.0	3.00	6.	2.
TAC APP	20	4.05	1.99	4.0	5.00	10.	1.
ILS	15	4.13	2.49	4.0	3.00	9.	1.
ILS MAN	13	1.92	1.04	2.0	1.00	4.	1.
ILS S.E.	3	1.00	0.00	1.0	1.00	1.	1.
GCA	29	7.13	2.62	7.0	5.00	13.	3.
GCA S.E.	5	1.40	0.89	1.0	1.00	3.	1.
GCA NO GYRO	7	1.00	0.00	1.0	1.00	1.	1.
MISSED APP	24	6.25	3.89	5.5	5.00	16.	1.
S.E. MISS APP	10	2.30	1.06	1.0	1.00	14.	1.
FINAL NAV CHECK	32	66.01	6.24	67.6	91.00	95.	57.

Table C12. **T-38 Instrument (Aircraft) Results for Total Number of Repetitions Data: Study II at Craig AFB (31 Students)**

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
GND OPS	31	19.61	1.17	20.0	20.00	22.	18.
ITO	31	19.74	1.50	19.0	19.00	24.	17.
CLIMB	31	20.87	2.01	20.0	20.00	26.	16.
STD	31	17.48	2.11	18.0	18.00	23.	13.
L.O.	31	28.16	6.33	26.0	26.00	41.	18.
TRN HDG	31	37.97	14.12	35.0	34.00	79.	19.
ST BAR	31	4.68	2.12	4.0	4.00	10.	1.
CHG A/S STAL	31	17.58	5.20	17.0	16.00	28.	7.
CHG A/S TURN	31	10.32	4.57	10.0	6.00	19.	2.
CAS CLIMB	31	9.42	3.47	9.0	7.00	18.	5.
CAS DESC	31	10.48	4.70	9.0	8.00	29.	5.
RATE CLMB	31	6.52	3.14	7.0	6.00	15.	2.
RATE DESC	31	7.32	4.42	6.0	6.00	20.	2.
VERT S A	31	7.13	2.83	6.0	6.00	19.	4.
VERT S B	30	3.77	1.81	3.0	3.00	8.	1.
VERT S C	24	2.13	1.03	2.0	2.00	5.	1.
VERT S D	30	4.13	2.50	3.5	3.00	12.	1.
S TURN 45 DEG	31	5.77	2.01	6.0	6.00	10.	2.
S TURN 60 DEG	31	13.97	3.50	14.0	14.00	21.	6.
S TURN TAC	26	1.42	1.09	2.0	1.00	4.	1.
SLO FLT	31	9.32	5.51	8.0	8.00	24.	2.
AIL ROLL	30	6.27	2.46	6.0	7.00	14.	3.
WING OVER	30	6.13	1.98	6.0	5.00	11.	2.
UN ATT	31	12.52	3.25	12.0	11.00	18.	7.
FIX FIX	31	13.32	2.37	13.0	13.00	20.	10.
MAIN COR	31	8.58	3.47	8.0	9.00	21.	3.
HOMING	24	2.08	1.32	1.5	1.00	5.	1.
ARC	31	6.42	1.78	6.0	6.00	10.	3.
HOLDING	31	7.74	1.39	8.0	8.00	11.	5.
PFA	31	9.26	1.98	10.0	10.00	14.	5.
ENROUTE DES	31	6.32	1.47	6.0	7.00	9.	3.
TAC APP	31	9.19	1.97	9.0	9.00	14.	5.
ILS	31	10.29	3.26	11.0	11.00	19.	4.
ILS MAN	31	4.00	1.71	4.0	4.00	9.	2.
ILS S.F.	20	1.50	.88	1.0	1.00	4.	1.
GCA	31	14.97	3.54	15.0	17.00	24.	9.
GCA S.F.	17	1.12	.33	1.0	1.00	2.	1.
GCA NO GYRO	30	2.17	1.53	1.5	1.00	5.	1.
MISSED APP	31	23.74	5.80	23.0	19.00	37.	13.
S.F. MISS APP	26	1.85	1.19	1.0	1.00	5.	1.
TIME STAL	3	2.00	1.73	1.0	1.00	4.	1.

Table C13. **T-38 Instrument (Trainer) Results for Repetitions to Proficiency Data: Study II at Craig AFB (31 Students)**

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
GND UPS	31	4.74	1.91	5.0	5.00	10.	2.
ILO	30	6.80	2.76	6.5	5.00	13.	2.
CLIMB	31	4.74	2.72	4.0	5.00	13.	1.
SID	31	5.58	2.32	5.0	5.00	10.	2.
L.O.	31	5.42	2.22	5.0	5.00	10.	1.
IRA MOD	30	5.73	2.48	6.0	5.00	11.	1.
ST MAN	27	3.70	1.94	3.0	3.00	9.	1.
CHG A/S STDL	30	4.90	2.12	5.0	6.00	10.	1.
CHG A/S TURN	27	4.33	1.98	4.0	4.00	9.	1.
LAS CLIMB	29	3.59	1.97	3.0	4.00	8.	1.
LAS DESC	30	3.30	2.26	3.0	1.00	8.	1.
RATE CLMB	29	2.83	1.81	3.0	2.00	7.	1.
RATE DESC	28	2.46	1.26	2.0	1.00	5.	1.
VERT S A	27	3.89	1.87	3.0	3.00	8.	1.
VERT S B	26	1.85	1.09	1.0	1.00	5.	1.
VERT S C	23	1.26	0.69	1.0	1.00	4.	1.
VERT S D	27	3.63	1.90	3.0	5.00	7.	1.
S TURN 45 DEG	30	2.53	1.88	2.0	2.00	7.	1.
S TURN 90 DEG	27	5.59	3.40	5.0	5.00	14.	1.
S TURN TAC	24	2.04	0.91	2.0	3.00	3.	1.
SLO FLT	24	3.29	1.20	3.0	4.00	6.	1.
AIL ROLL	29	5.38	2.81	5.0	3.00	12.	2.
WING OVER	26	6.92	3.95	6.0	5.00	16.	2.
UN ATT	23	6.26	2.72	7.0	8.00	12.	1.
FIX FIX	28	7.79	3.81	7.5	6.00	19.	1.
MAIN COR	30	3.83	2.52	3.0	3.00	12.	1.
HOMING	26	1.54	0.71	1.0	1.00	3.	1.
ARC	26	3.65	1.74	3.0	2.00	8.	2.
HOLDING	27	5.33	2.31	5.0	5.00	10.	1.
PEN	26	6.23	2.78	5.5	9.00	11.	2.
ENROUTE DES	21	3.24	1.30	3.0	4.00	6.	1.
TAC APP	23	6.00	2.95	6.0	2.00	11.	2.
ILS	21	5.14	2.42	5.0	7.00	10.	1.
ILS MAN	19	2.63	1.42	2.0	4.00	6.	1.
ILS S.E.	17	1.35	0.61	1.0	1.00	3.	1.
GCA	23	4.74	2.45	4.0	4.00	10.	1.
GCA S.E.	15	1.53	0.52	2.0	2.00	2.	1.
GCA NO GYRO	14	1.80	0.53	2.0	2.00	3.	1.
MISSED APP	26	6.73	5.33	4.0	4.00	22.	1.
S.E. MISS APP	20	1.85	0.81	2.0	1.00	3.	1.
FINAL NAV CHECK	31	85.78	8.22	87.5	91.00	95.	57.

Table C14. **T-38 Instrument (Trainer) Results for Total Number of Repetitions Data: Study II at Craig AFB (31 Students)**

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
GND OPS	31	19.97	1.99	20.0	20.00	24.	12.
TTO	31	22.52	1.84	22.0	23.00	26.	18.
CLIMB	31	22.48	2.58	22.0	22.00	34.	18.
STD	31	20.94	1.63	21.0	20.00	25.	17.
L.O.	31	25.23	3.41	25.0	27.00	33.	18.
TRN HDG	31	28.48	7.60	25.0	29.00	46.	14.
ST BAR	31	5.68	3.15	4.0	4.00	13.	1.
CHG A/S STAL	31	14.68	4.27	14.0	15.00	25.	7.
CHG A/S TURN	31	7.87	4.15	7.0	7.00	19.	2.
CAS CLIMB	31	7.74	2.91	7.0	10.00	17.	4.
CAS DESC	31	7.77	2.74	8.0	8.00	14.	4.
RATE CLIMB	31	5.55	2.23	5.0	5.00	12.	2.
RATE DESC	31	4.74	2.05	5.0	5.00	11.	2.
VERT S A	31	7.87	2.53	8.0	9.00	14.	2.
VERT S B	29	1.93	1.25	1.0	1.00	5.	1.
VERT S C	24	1.58	1.02	1.0	1.00	4.	1.
VERT S D	31	5.84	2.52	6.0	3.00	12.	2.
S TURN 45 DEG	31	4.16	2.15	4.0	4.00	10.	1.
S TURN 60 DEG	31	9.26	3.49	8.0	8.00	18.	3.
S TURN TAC	31	3.32	2.82	3.0	4.00	16.	1.
SLO FLT	31	6.19	2.34	6.0	7.00	11.	1.
ATL ROLL	31	12.19	2.81	11.0	11.00	17.	7.
WING OVER	31	11.71	3.87	11.0	15.00	19.	4.
UN ATT	31	11.81	3.12	12.0	11.00	20.	4.
FIX FIX	31	16.84	2.77	17.0	16.00	25.	11.
MAIN COR	31	8.06	3.53	8.0	9.00	17.	3.
HOMING	30	2.40	2.16	2.0	2.00	12.	1.
ARC	31	7.71	1.99	8.0	8.00	12.	4.
HOLDING	31	11.23	1.73	11.0	11.00	14.	7.
PPO	31	12.29	1.99	13.0	13.00	16.	8.
ENROUTE DES	31	6.16	2.27	6.0	6.00	16.	4.
TAC APP	31	12.06	1.18	12.0	12.00	15.	10.
ILS	31	10.61	1.65	10.0	10.00	14.	6.
ILS MAN	31	4.81	1.40	5.0	5.00	7.	2.
ILS S.E.	31	2.39	1.23	2.0	2.00	6.	1.
GCA	31	7.87	2.46	8.0	9.00	13.	1.
GCA S.E.	28	2.07	.72	2.0	2.00	4.	1.
GCA NO GYRO	31	2.65	2.95	2.0	2.00	18.	1.
MISSED APP	31	19.32	5.21	20.0	24.00	26.	3.
S.E. MISS APP	30	3.47	1.07	3.5	4.00	6.	2.
TIME STAL	2	1.00	.00	1.0	1.00	1.	1.

Table C15. **T-38 Two-Ship Formation Results for Number of Repetitions to Proficiency Data: Study II at Craig AFB (28 Students)**

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
GND OPS	28	3.21	2.51	2.0	1.00	10.	1.
TFC PATN	26	4.62	3.70	3.5	1.00	12.	1.
LDG	25	4.16	3.34	3.0	1.00	11.	1.
WING T.O.	27	3.85	1.32	4.0	3.00	7.	2.
CLIMB	23	3.52	2.13	3.0	3.00	11.	1.
CROSS	28	10.14	7.34	8.0	5.00	29.	1.
ROUTE	28	9.39	5.47	9.0	9.00	24.	2.
ECH TURN	25	9.04	4.64	8.0	7.00	21.	1.
PITCHOUT	27	7.30	4.90	6.0	6.00	20.	2.
TRN RJ	25	10.32	5.26	9.0	7.00	28.	3.
ST RJ	24	5.71	2.68	5.0	4.00	13.	2.
3 RJ	15	2.67	.98	3.0	3.00	4.	1.
OVERSHOOT	18	3.61	1.94	3.5	4.00	10.	1.
TRAIL	16	3.63	1.71	3.5	4.00	7.	1.
INST APP	4	2.00	1.15	2.0	3.00	3.	1.
POS CHNG TO WING	24	4.04	2.42	3.0	3.00	9.	1.
TO LEAD	26	3.23	1.77	3.0	4.00	7.	1.
LEAD T.O.	24	3.71	2.29	3.0	2.00	8.	1.
CLIMB	25	3.80	2.38	3.0	3.00	9.	1.
LO	25	3.68	2.38	3.0	3.00	10.	1.
PO & TRJ	27	7.37	5.74	5.0	5.00	24.	1.
PO & SRJ	24	4.33	2.33	4.0	3.00	11.	2.
ECH TUR	26	6.92	5.99	5.0	5.00	28.	1.
TRAIL	16	4.06	2.02	4.0	4.00	9.	1.
YES OR PEN	22	3.77	2.49	3.5	2.00	12.	1.
TFC ENT	23	3.83	2.72	3.0	3.00	12.	1.
INST APP	9	1.78	.67	2.0	2.00	3.	1.
FINAL 2 SHIP CHECK	28	86.28	5.05	88.3	88.00	94.	76.

Table C16. **T-38 Two-Ship Formation Results for Total Number of Repetitions Data: Study II at Craig AFB (33 Students)**

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
GND OPS	33	25.52	2.67	26.0	26.00	29.	18.
TFC PATN	33	23.97	3.65	25.0	27.00	30.	15.
LOG	33	23.03	3.81	24.0	25.00	30.	14.
WING T.O.	33	12.48	2.15	13.0	13.00	17.	8.
CLIMB	33	13.55	2.76	13.0	15.00	23.	10.
CROSS	33	43.45	13.15	41.0	56.00	83.	22.
ROUTE	33	37.00	10.42	35.0	28.00	72.	25.
ECH TURN	33	28.45	6.62	28.0	27.00	45.	13.
PITCHOUT	33	36.12	9.51	36.0	43.00	60.	17.
TRN RJ	33	30.21	4.69	30.0	33.00	40.	21.
ST RJ	33	18.30	3.85	19.0	19.00	30.	11.
3 RJ	33	5.30	1.81	5.0	5.00	10.	2.
OVERSHOOT	33	7.27	2.40	7.0	6.00	13.	3.
TRAIL	33	11.73	2.18	12.0	13.00	15.	7.
INST APP	22	1.32	1.40	1.0	1.00	7.	1.
POS CHNG TO WING	33	16.09	4.84	16.0	20.00	25.	6.
TO LEAD	33	15.36	4.01	16.0	18.00	22.	4.
LEAD T.O.	33	12.79	2.12	13.0	14.00	17.	9.
CLIMB	33	12.91	2.05	13.0	14.00	17.	9.
LO	33	13.42	2.60	14.0	14.00	18.	6.
PO & TRN	33	29.52	5.10	30.0	30.00	39.	20.
PO & SRJ	33	14.58	4.10	16.0	16.00	24.	6.
ECH TURN	33	24.15	7.71	27.0	27.00	42.	8.
TRAIL	33	12.15	2.40	12.0	12.00	18.	7.
OES OR PEN	33	13.97	2.32	14.0	13.00	18.	9.
TFC ENT	33	12.70	2.72	13.0	12.00	18.	6.
INST APP	23	1.87	1.25	1.0	1.00	5.	1.

Table C17. **T-38 Four-Ship Formation Results for Number of Repetitions to Proficiency Data: Study II at Craig AFB (32 Students)**

VARIABLE NAME	SAMPLE SIZE	MEAN	STANDARD DEVIATION	MEDIAN	MODE	MAXIMUM	MINIMUM
GND OPS	32	1.00	.00	1.0	1.00	1.	1.
TFC PATN	21	1.05	.22	1.0	1.00	2.	1.
LDG	22	1.09	.29	1.0	1.00	2.	1.
WING T.O.	17	1.06	.24	1.0	1.00	2.	1.
JOIN 3	17	1.00	.00	1.0	1.00	1.	1.
CLIMB	20	1.00	.00	1.0	1.00	1.	1.
TIME FT 23	13	1.38	.96	1.0	1.00	4.	1.
TIME FT 4	13	1.23	.60	1.0	1.00	3.	1.
FCH AS 2	21	1.14	.48	1.0	1.00	3.	1.
FCH AS 34	28	1.14	.59	1.0	1.00	4.	1.
ROUTE	32	1.13	.42	1.0	1.00	3.	1.
PITCHOUT	30	1.07	.25	1.0	1.00	2.	1.
TURN RJ 24	20	1.05	.22	1.0	1.00	2.	1.
TURN RJ 3	25	1.08	.28	1.0	1.00	2.	1.
ST RJ 24	18	1.11	.32	1.0	1.00	2.	1.
ST RJ 3	19	1.05	.23	1.0	1.00	2.	1.
OVERSHOOT	11	1.09	.30	1.0	1.00	2.	1.
CROSS AS 2	20	1.10	.31	1.0	1.00	2.	1.
CROSS AS 3	21	1.14	.48	1.0	1.00	3.	1.
CROSS AS 4	18	1.06	.24	1.0	1.00	2.	1.
LEAD T.O.	23	1.04	.21	1.0	1.00	2.	1.
CLIMB	22	1.05	.21	1.0	1.00	2.	1.
PO & TRJ	27	1.11	.42	1.0	1.00	3.	1.
PO & SRJ	23	1.00	.00	1.0	1.00	1.	1.
DES	22	1.00	.00	1.0	1.00	1.	1.
TFC ENT	19	1.05	.23	1.0	1.00	2.	1.
POS CHNG	5	1.00	.00	1.0	1.00	1.	1.

Table D1. **T-37 Contact Data Collection Card (Front)**

CONTACT

DATE _____ MISSION _____ IP _____ STUD _____

TASK	U	F	G	E	TASK	U	F	G	E
GRD OPS					VERT RECV				
TAKEOFF					30 TURN				
T.O. CLIMB					45 TURN				
LEVEL OFF					60 TURN				
TIME ARRIVE AREA					TIME ST&L				
ST PRW ST					MAX C TURN				
T PWR ST					L-8				
PO TPS					LOOP				
NH TPS					A-R				
NL TPS					B-R				
L TPS					C-8				
SLOW FLT					IMM				
SPIN PREV					C-1				
SPIN					SPLIT-S				
INV RECV					TIME DEPT AREA				
DIVE RECV									

REMARKS:

Table D2. **T-37 Contact Data Collection Card (Back)**

HEADPIN RWY

TASK	U	F	G	E
ST-IN NORM				
" " LANDING				
ST-IN NO FLAP				
" " LANDING				
OVH NORM PATTERN				
" " LANDING				
SS PATTERN				
" LANDING				
CLOSED				
GO-AROUND				
STEEP TURNS				

WILLIAMS RWY

TASK	U	F	G	E
NORMAL PATTERN				
" LANDING				
SS PATTERN				
" LANDING				
CLOSED				
GO-AROUND				
STEEP TURNS				

Table D3. **T-37 Instrument Data Collection Card**

INSTRUMENT

DATE _____ MISSION _____ IP _____ STUD _____

TASK	U	F	G	E	TASK	U	F	G	E
GRD OPS					VERT S C				
ITO					D				
CAS CLIMB					UN ATT				
T.O. CLIMB					A. ROLL				
L. O.					W. OVER				
TIME AREA ENTRY					O INTERCEPT				
CAS DESCENT					I INTERCEPT				
RATE CLIMB					RMI ONLY O				
RATE DESCENT					RMI ONLY I				
CHG A/S					TIME DEP AREA				
TURNS TO HDG					HOLDING				
S TURN 45°					PENETRATION				
S TURN 60°					LOW APP				
TIME ST & L					MISSED APP				
VERT S. A					NORM PATTERN				
B					NORM LANDING				
C					GO-AROUND				
					CLOSED				

REMARKS:

Table D4. **T-37 Formation Data Collection Card**

FORMATION T-37

DATE _____ MISSION _____ IP _____ STUD _____

TASK	U	F	G	E
GND OPS				
VISUAL SIG				
PATTERN				
LANDING				
POS CHG				
WING				
TAKEOFF				
CLB & L.O.				
ST & L				
TURNS				
CLB & DESC				
CROSS UND				
PWR CONT				
REJOINS				
TIME ENT AREA				
TIME EXT AREA				
AREA				

TASK	U	F	G	E
LEAD				
TAKEOFF				
CLIMB				
LEVEL OFF				
WING CONSID				
P.O. & REJ				
TRAF ENT				

REMARKS:

Table D5. **T-38 Contact Data Collection Card (Front)**

CONTACT T-38

DATE _____ MISSION _____ IP _____ STUD _____

TASK	U	F	G	E
GND OPS				
TAKE OFF				
CLIMB				
L.O.				
TIME ENTERED AREA				
TURNS				
FN TN FF STL				
ST AHD FF STL				
FN TN STL NF				
ST AHD NF STL				
AFT STICK N				
AFT STICK85				
SLO FLT				
L-8				
LOOP				
A-R				
B-R				
C-8				
IMM				
C-L				
SPLIT-S				
CHANDELLE				
VERT RCVY				
HI SP DIVE				
TIME DEP AREA				
N PAT P/O				
N FIN TURN				

Table D6. **T-38 Contact Data Collection Card (Back)**

TASK	U	F	G	E
N FIN APP				
NORM TD				
GO AROUND				
CLOSED				
S.E. PATN				
S.E. FINAL				
S.E. TD				
S.E. GO				
NF PAT P/O				
NF FIN TURN				
NF FIN APP				
NF TD				
HVY PATN				
HVY LDG				
HVY GO				
TIME S&L				

AREA (CHECK ONE)	DAY	NIGHT	AREA (CHECK ONE)	DAY	NIGHT
HOPI			GERONIMO		
SAN CARLOS			PIMA		
KLONDYKE			PAPAGO		
APACHE			PATTERN ONLY		
NAVAJO			OTHER (SPECIFY)		
CHEROKEE					

REMARKS:

Table D7. T-38 Instrument Data Collection Card (Front)

INSTRUMENT T-38

DATE _____ MISSION _____ IP _____ STUD _____

TASK	U	F	G	E
GND OPS				
ITO				
CLIMB				
SID				
L.O.				
TIME AREA ENTRY				
TRN HDG				
ST BAR				
CHG A/S S&L				
CHG A/S TURN				
CAS CLB				
CAS DES				
RATE CLB				
RATE DES				
VERT S A				
" B				
" C				
" D				
S TURN 45°				
S TURN 60°				
S TURN TAC				
SLO FLT				
AIL ROLL				
WINGOVER				
UN ATT				
TIME DEPART AREA				

Table D8. **T-38 Instrument Data Collection Card (Back)**

TASK	U	F	G	E
FIX FIX				
INT MAIN CO				
HOMING				
ARC				
HOLDING				
PEN				
ENROUTE DES				
TAC APP				
ILS				
ILS MAN				
ILS S.E.				
GCA				
GCA S.E.				
GCA NO GYRO				
MISSED APP				
SE MISS APP				
TIME STAL				

AREA	CHECK ONE		CHECK ONE	
A		SHORTSTOP		
B		WILLIE PATN		
C		RITTENHOUSE		
D		LUKE		
E		TALON		
F		OTHER(EXPLAIN)		
G				
H				
I				

REMARKS:

Table D9. T-38 2-Ship Formation Data Collection Card (Front)

2 SHIP FORMATION T-38				
DATE _____	MISSION _____	IP _____		STUD _____
TASK	**U**	**F**	**G**	**E**
GENERAL				
GND OPS				
TFC PATN				
LDG				
WING				
T.O.				
CLIMB				
CROSS				
ROUTE				
ECH TURN				
PITCHOUT				
TRN RJ				
ST RJ				
#3 RJ				
OVERSHOOT				
TRAIL				
INST APP				
TIME IN FINGERTIP				
POSITION CHANGE				
TO WING				
TO LEAD				
LEAD				
T.O.				
CLIMB				
L.O.				
PO&TRJ				
PO&SRJ				

Table D10. **T-38 Ship Formation Data Collection Card (Back)**

TASK	U	F	G	E
ECH TURN				
TRAIL				
DES OR PEN				
TFC ENT				
INST APP				

AREA (CHECK ONE)	DAY	NIGHT	AREA (CHECK ONE)	DAY	NIGHT
A			HOPI		
B			SAN CARLOS		
C			KLONDYKE		
D			APACHE		
E			NAVAJO		
F			CHEROKEE		
G			GERONIMO		
H			PIMA		
I			PAPAGO		
OTHER (SPECIFY)			HEBER		

REMARKS:

Table D11. **T-38 Ship Formation Data Collection Card (Front)**

4 SHIP FORMATION T-38				
DATE	MISSION		IP	STUD
TASK	**U**	**F**	**G**	**E**
GENERAL				
GND OPS				
TFC PATN				
LDG				
WING				
T.O.				
JOIN 3				
CLIMB				
TIME FT2&3				
TIME FT 4				
ECH AS 2				
ECH AS 3&4				
ROUTE				
PITCHOUT				
TURN RJ2&4				
TURN RJ 3				
ST RJ 2&4				
ST RJ 3				
OVERSHOOT				
CROSS AS2				
CROSS AS3				
CROSS AS4				
LEAD				
T.O.				
CLIMB				
PO&TRJ				
PO&SRJ				

Table D12. **T-38 4-Ship Formation Data Collection Card (Back)**

TASK	U	F	G	E
DES				
TRC ENT				
POSITION CHANGE				
EL PC LEAD				
EL PC 3				
EC PC LEAD				
EC PC 2				

AREA (CHECK ONE)	DAY	NIGHT	AREA (CHECK ONE)	DAY	NIGHT
A			F		
B			G		
C			H		
D			I		
E					

REMARKS:

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